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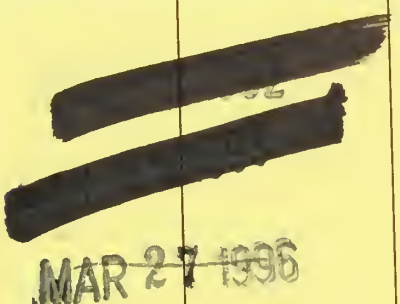


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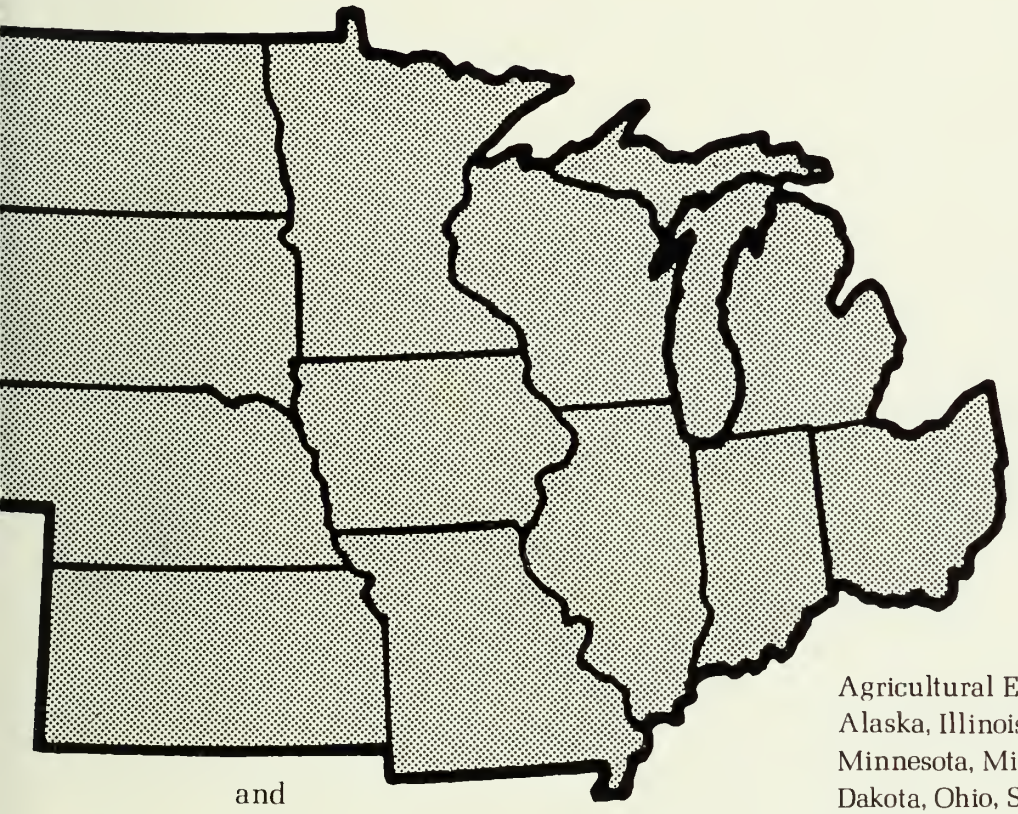
# Water Infiltration

## Into Representative Soils of the North Central Region



and
ALASKA

Agricultural Experiment Stations of
Alaska, Illinois, Indiana, Iowa, Michigan,
Minnesota, Missouri, Nebraska, North
Dakota, Ohio, South Dakota, and Wisconsin,
and the Agricultural Research Service, U.S. Department
of Agriculture, cooperating.

Urbana, Illinois
February, 1979

Agricultural Experiment Station
University of Illinois
Bulletin 760

North Central Regional
Research Publication
259

Sponsored by the Agricultural Experiment Stations of Alaska, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin and by the Agricultural Research Service, U.S. Department of Agriculture.

This publication was prepared by the North Central Regional Committee 40 on Water Infiltration Rate Methods and Determinations on Soils and by a subcommittee of that group. Members of the Regional Technical Committee were as follows:

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*Illinois* — B. A. Jones, Jr.
*Indiana* — D. Wiersma, A. R. Bertrand
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*Nebraska* — H. D. Wittmuss
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The standard report forms for summarizing the data were developed by the following subcommittee: H. D. Wittmuss, University of Nebraska; A. E. Erickson, Michigan State University; and R. J. Hanks, Kansas State University. R. H. Rust, University of Minnesota, and M. Amemiya, Iowa State University, prepared the instructions for the statistical analyses. R. H. Rust assembled the regional soils map with site identifications.

Another subcommittee — J. R. Runkles, South Dakota State University; W. E. Larson, Iowa State University; and G. E. Wilkinson, North Dakota State University — studied procedures for determining capillary conductivity values that might be used in R. J. Hanks' computer program for the numerical solution to the moisture-flow equation for infiltration in layered soils.

The Committee expresses its appreciation to the many soil scientists in the Experiment Stations and in the Soil Conservation Service who assisted in the project by helping identify sites and describing the profiles at the sites. Thanks also are given to the many other personnel who assisted in collecting, processing, and analyzing data.

The Illinois Agricultural Experiment Station provides equal opportunities in programs and employment.

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* Because not everyone will need or want the bulky, technical data (as described on page 5) detailed in the appendixes, this bulletin is published in two forms, one with and one without appendixes. If your copy does not include the appendixes but you want them, request them from the Office of Agricultural Publications, c/o 57 Mumford Hall, University of Illinois at Urbana-Champaign, Urbana, IL 61801.

## *PREFACE*

In the mid-1950's a number of groups within the state Agricultural Experiment Stations and the U.S. Department of Agriculture identified the determination of the rate of water infiltration into soils as a high priority area for research in the midwestern states. In response to this need, a regional committee (NC-40) was formed to coordinate research for improving field measurement methods and for determining infiltration rates of some major soils of the region.

Results of the field measurements were published by some of the states, but the planned regional bulletin to summarize the project did not materialize. In recent years renewed public interest in improved water management, with emphasis on water quality and energy conservation, has shown again the relevance of the earlier work and the desirability for a summarizing bulletin. Although more recent laboratory studies will supersede some of the laboratory work of NC-40, no new methods have been developed that outdate the field measurements. Finally, the basic field data never before published should provide a storehouse of information for both action agencies and soil science researchers.

*James M. Beattie*
Administrative Adviser, NC-40

## *INTRODUCTION*

This bulletin presents infiltration rates and detailed information on physical and water-related properties of 32 major soils in the North Central States of the United States and in Alaska. The data are the results of the work of North Central Regional Technical Committee 40, which was established to develop field techniques for getting uniform data on rates of infiltration of water into soils. These data, when used to supplement other soils information in bulletins such as Soils of the North Central Region of the United States (*1*),[1] should help soil scientists, engineers, hydrologists, and others deal more precisely with a wide spectrum of water-resource management and conservation problems. Careful water-resource management is essential to a stable and efficient agriculture; to this end, the impacts of droughts and torrential storms can and must be minimized.

Although some of the scientists on the NC-40 Committee have published summaries of the results of the studies they conducted in their states (see page 12), detailed data on the physical and water-related properties of the 32 soils and the complete infiltration rate data have not been published. In this bulletin the wet-run equilibrium infiltration rate data for soils tested in a state are summarized and analyzed statistically by that state's scientists, and the data are summarized for the entire region. Finally, studies to estimate relative infiltration rates from selected parameters are briefly discussed.

The optional appendixes to this bulletin (see Table of Contents) provide data on all soils and crop cover conditions, serving as a resource for a wide range of scientists and for workers in agencies who may wish to perform additional analyses. Specifically, the appendixes present infiltration rates for dry and wet measurements, using a sprinkling infiltrometer, on up to three soils each with up to three crop cover conditions; a description of the soil profile at each site; a mechanical analysis and the bulk density of the horizons in the soil profile; moisture-release values; and antecedent moisture in the horizons of the profile before each infiltration measurement.

This extensive amount of data was deemed necessary by the NC-40 Committe to achieve these research objectives:

1. To develop and field-test practical methods for determining relative infiltration rates of soils during irrigation and during rains.
2. To determine infiltration rates for certain soil types under various management practices.
3. To estimate relative infiltration rates from selected soil parameters.

[1] Italicized numerals in parentheses refer to entries in Literature Cited, page 26.

## *OBJECTIVE ONE: To develop and field-test practical methods for determining relative infiltration rates of soils during irrigation and during rains*

The first phase of the project was an extensive review of literature to determine the factors that influence infiltration and to determine the advantages and limitations of the various infiltrometers developed before 1959.[1] Parr and Bertrand (*2*) reported that many research workers investigated methods of determining infiltration rates of soils. Often, the methods were developed to meet a specific need, and in many cases the particular method had limited acceptance and limited use. Infiltration-measuring equipment could be classified into three categories:

1. Instruments in which infiltration is determined as the difference between water applied and runoff.
2. Instruments that impound water in a confined area, thus maintaining a head of water.
3. Instruments that allow the determination of infiltration from rainfall data.

Another classification placed infiltration equipment into three categories according to the kind of confinement of the soil and water during the measurement period:

1. Tubes, cylinders, or compartments of various sizes encasing the soil so that no lateral movement of water is permitted.
2. No confinement, so that there is unrestricted lateral movement of the water.
3. Buffer compartments to compensate for lateral subsurface flow away from the soil being investigated.

On the basis of their study, Bertrand and Parr (*3*) concluded that an acceptable infiltrometer should have the following minimum requirements:

1. Should provide data comparable with a known standard.
2. Should be large enough to evaluate the effect of crop residue and growing plants, but not so large that its usefulness is seriously limited by bulkiness.
3. Should apply water in drops with a known amount of energy.
4. Should evaluate the vertical component of liquid flow throughout the soil.

These criteria were used to develop a sprinkling infiltrometer (*4*). Figure 1 shows the schematic of a unit by which infiltration is determined by calculating the difference between applied water and runoff. The instrument itself, shown in Figure 2, has the following components:

1. A metal plot frame, 3.81 x 3.81 feet (1/3,000 acre), equipped with a runoff collection device and a calibration pan.
2. A circulating runoff accumulation system (Fig. 3).
3. Three spray nozzles that, when used individually, provide a range of water intensity and drop size.
4. A water-stage recorder.
5. A telescoping pipe tower for attaching the nozzle and providing support for a wind shield.
6. A pressure tank.
7. A pump and power unit.
8. A water supply tank.

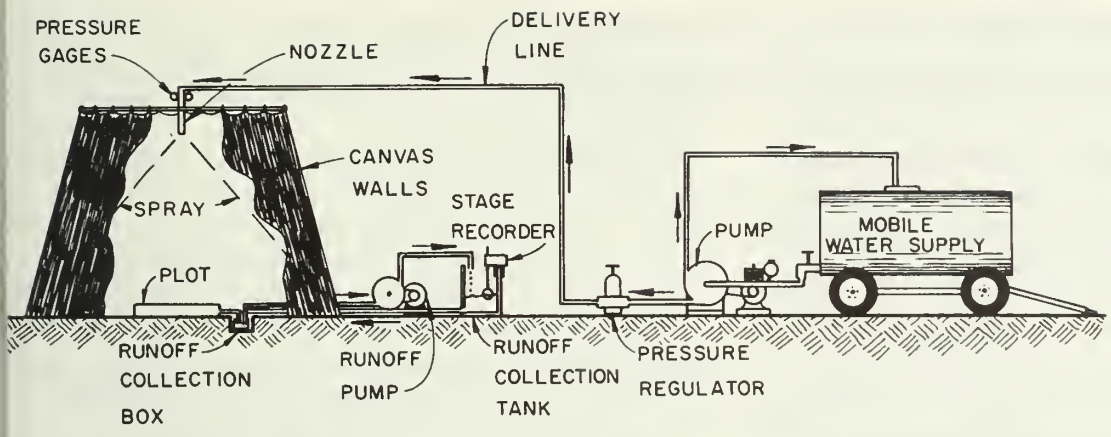
Specific details of each item are reported in the Purdue bulletin (*4*).

As new infiltrometers were built by the cooperating states, minor modifications were incorporated, primarily for convenience; the basic characteristics of the instrument, however, were not changed throughout the project. Most of the convenience modifications were incorporated in one of the last instruments built for the project, described by the Wisconsin Experiment Station (*5*).

The two most significant modifications, which may have had some effect on infiltration measurements, were made early in the project. The dimension of the vertical sides of the plot frames was increased so that the sides would extend further into the soil, and a modified canvas wind shield was added. The frames penetrated 1½ to 8 inches into the soil, depending upon the soil being measured; the actual depth used depended upon the judgment of the researcher at each site. The tepee canvas closed the top of the tower and provided somewhat more stable conditions inside the tower.

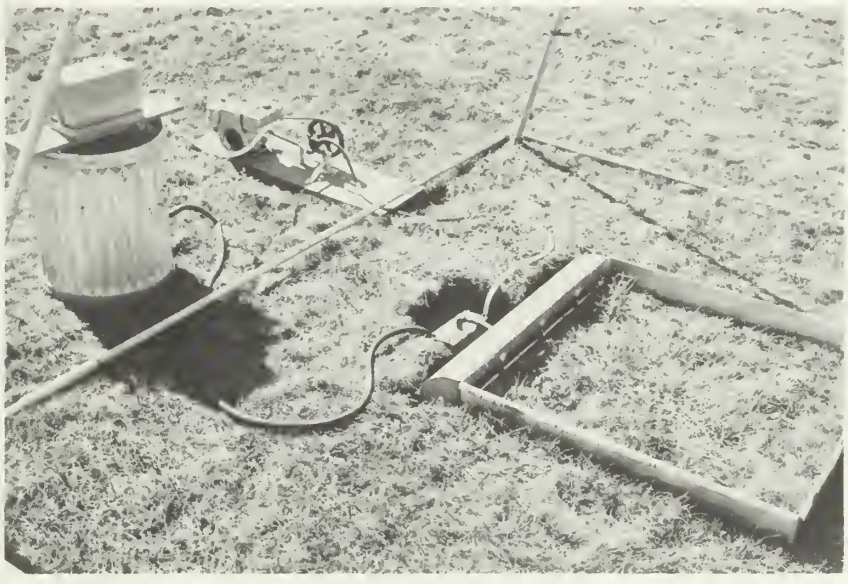
The operating procedure required that the application rate be calibrated before and after a test. Many researchers desired additional measurements during a test to ascertain the uniformity of application rate. Two methods of testing predominated; some states used one of the two methods and others used both methods, though not simultaneously. Alaska used troughs on the outside of the plot frame and collected the water by various means. Minnesota, Ohio, and Wisconsin used plastic rain gauges alongside the plot frame and read them periodically. Illinois and Nebraska used both methods during their tests. None of these calibration devices intercepted any of the water falling inside the plot frame.

[1] This review was financed largely by Research and Marketing Act Contract No. 12-14-100-1031(41) between Purdue University and the Agricultural Research Service, U.S. Department of Agriculture.

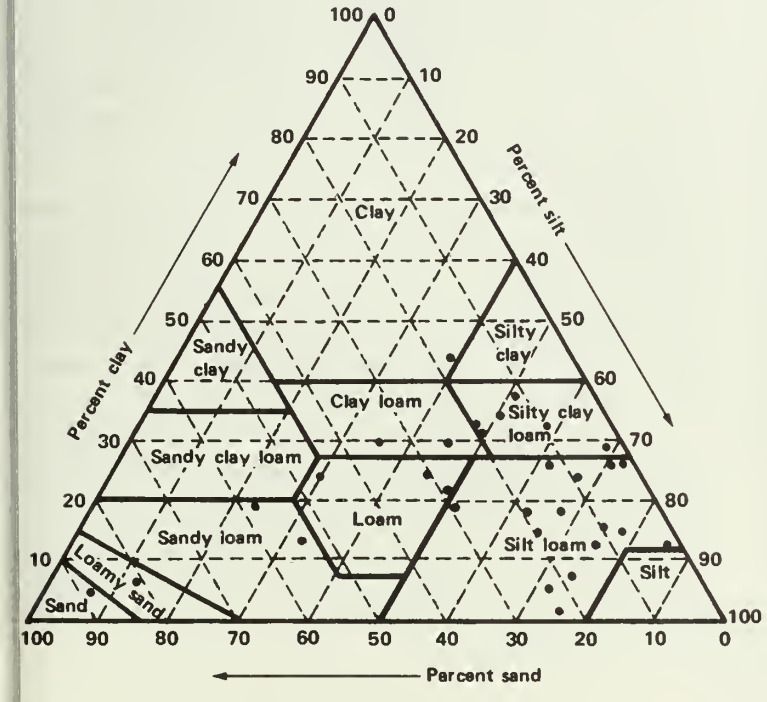



Schematic diagram of experimental arrangement of portable sprinkling infiltrometer. (Fig. 1)

prinkling infiltrometer in operation. (Fig. 2)



During an infiltration measurement, water flows from the plot, through the flume, and into the runoff collection box in the sump. The pump lifts water through the hose and into the runoff collection tank. The recorder above the tank charts runoff rate and volume. (Fig. 3)




Textural classification of soil types tested in the region (predominantly silt loam). (Fig. 4)

## *OBJECTIVE TWO: To determine infiltration rates for certain soil types under various management practices*

### Soils Tested and Standard Field Procedures

To accomplish its second objective, the Committee decided that the infiltrometer should be tested, if possible, on three major soils in each state under uniform crop cover conditions. The Committee asked the NCR-3 Committee on Soil Surveys to recommend for each state soils of major importance and differing in physical properties. Because it was impossible to locate on Experiment Station lands all of the soils recommended, there were some changes from the original recommendations when final sites were selected. Below are listed the soils tested in each participating state. The location of each test site is shown in Figure 5, adapted from Soils of the North Central Region of the United States (*1*). The numbers after the names key the soils in the list to the site numbers on the map.

| | |
|---|---|
| Alaska | Bodenburg silt loam, 3 — coarse-silty, over sandy or sandy-skeletal, mixed, nonacid Typic Cryorthents |
| | Knik silt loam, 19 — coarse-silty, over sandy or sandy-skeletal, mixed nonacid Typic Cryorthents |
| | Minto silt loam, 22 — coarse-silty, mixed, nonacid Aeric Cryaquepts |
| Illinois | Cisne silt loam, 6a, 6b — fine, montmorillonitic, mesic Mollic Albaqualfs |
| | Elliott silt loam, 9 — fine, illitic, mesic Aquic Argiudolls |
| | Flanagan silt loam, 12 — fine, montmorillonitic, mesic Aquic Argiudolls |
| Indiana | Cincinnati silt loam, 5 — fine-silty, mixed, mesic Typic Fragiudalfs |
| | Clermont silt loam, 7 — fine-silty, mixed, mesic Typic Ochraqualfs |
| | Russell silt loam, 27 — fine-silty, mixed, mesic Typic Hapludalfs |
| Iowa | Grundy silt loam, 13 — fine, montmorillonitic, mesic Aquic Argiudolls |
| | Ida silt loam, 16 — fine-silty, mixed (calcareous), mesic Typic Udorthents |
| | Moody silt loam, 23 — fine-silty, mixed, mesic Udic Haplustolls |
| Michigan | Emmet loamy sand, 10 — coarse-loamy, mixed, frigid Alfic Haplorthods |
| | Miami sandy loam, 21 — fine-loamy, mixed, mesic Typic Hapludalfs |
| | Sims loam, 30 — fine, mixed, nonacid, frigid Mollic Haplaquepts |
| Minnesota | Kenyon silt loam, 18 — fine-loamy, mixed, mesic Typic Hapludolls |
| | Port Byron silt loam, 26 — fine-silty, mixed, mesic Typic Hapludolls |
| | Webster clay loam, 31 — fine-loamy, mixed, mesic Typic Haplaquolls |
| Nebraska | Holdrege silt loam, 14 — fine-silty, mixed, mesic Typic Argiustolls |
| | Keith very fine sandy loam, 17 — fine-silty, mixed, mesic Aridic Argiustolls |
| | Sharpsburg silty clay loam, 28 — fine, montmorillonitic, mesic Typic Argiudolls |
| North Dakota | Bearden silty clay loam, 1 — fine-silty, frigid Aeric Calciaquolls |
| | Morton loam, 24 — fine-silty, mixed Typic Argiborolls |
| Ohio | Blount silty clay loam, 2 — fine, illitic, mesic Aeric Ochraqualfs |
| | Canfield silt loam, 4 — fine-loamy, mixed, mesic Aquic Fragiudalfs |
| | Hoytville clay, 15 — fine, illitic, mesic Mollic Ochraqualfs |
| South Dakota | Dudley clay loam, 8 — fine, montmorillonitic, mesic Typic Natrustolls |
| | Kranzburg silty clay loam, 20 — fine-silty, mixed Udic Haploborolls |
| | Sinai silty clay loam, 29 — fine, montmorillonitic Pachic Udic Haploborolls |
| Wisconsin | Fayette silt loam, 11 — fine-silty, mixed, mesic Typic Hapludalfs |
| | Plainfield loamy sand, 25 — mixed, mesic Typic Udipsamments |
| | Withee silt loam, 32 — fine-loamy, mixed, frigid Aeric Glossaqualfs |

Uniform soils data taken at each test site included a complete description of the profile, a determination of the bulk density of each horizon, a mechanical analysis of each horizon, and moisture-release values to a 60-inch depth. These data were taken even when the test sites were only a short distance apart, so that detailed data would be available for studies for Objective Three — estimation of infiltration rates from soil parameters — and for future reference, should research methodology change and make the data essential.

Because the soils were selected for their importance in each state and in the region, silt loam soil types predominated within the group, as shown in Figure 4. The relatively small variation in the physical properties of the soils limited the range of data available for studies for Objective Three, but the Committee believed that the need for practical field values of infiltration rates on major soils outweighed the research need for a more ideal distribution of the physical properties of the soils.

To provide different crop cover test conditions, infiltration rate measurements were made on plots in corn or bromegrass (or a more common grass for the state). Most tests were made on plots in at least third-year corn or grass, the conditions recommended by the Committee. Because of limitations on time and land, however, some variation among states was necessitated. The decision on the appropriateness of a substitution was left to the discretion of the state scientist.

The statistical design for the field tests called for three plots (replicates) of each crop cover condition on each soil, each plot being large enough to permit two measurements (duplicates). With this statistical design, sampling error (a measure of the variation between duplicates within cover treatment plots) could be determined as well as experimental error (a measure of the failure of differences between crop cover conditions to be equal in all replications). The following field procedures were recommended:

Use 7LA nozzle.[1]

Make first tests at the soil moisture content found at the site. Continue test until a uniform rate of infiltration is recorded for 15 minutes.

Make second tests 24 hours after the first tests. Continue tests until a uniform rate of infiltration is recorded for 15 minutes.

*For corn tillage and cover —*

Plow the plots using the plowing practices used by most of the farmers who farm the particular soil type.

Disk one time.

Plant corn and make one set of tests before plants emerge.

Make a second set of tests after the first cultivation in which the surface of the soil has been broken with a manure fork run up and down the slope at a depth of 2 inches.

*For bromegrass cover —*

Clip and remove the grass to simulate conditions after the first cutting of hay.

[1] The 7LA nozzle, manufactured by the Spray Engineering Co., Burlington, Mass., was directed downward at a height 9 feet above the plot and operated at a pressure of 6 pounds per square inch. Under these conditions, the nozzle has a nominal intensity of 4.5 inches per hour, a spray diameter of 13.6 feet, and a kinetic energy of approximately 605 tons per acre-inch.

Additional data recommended to be included were the moisture content of the upper soil horizon before and after the tests, soil temperature at the 2-inch level before and after the tests, and water temperature during the tests.

Because of time limitations, it was decided that the measurements under the different crop cover conditions should have the following priority:

1. Corn seedbed before cultivation.
2. Clipped bromegrass.
3. Corn after first cultivation.

When circumstances permitted, states made additional studies; those results are reported here if they are pertinent to the standard tests.

## Results and Discussion

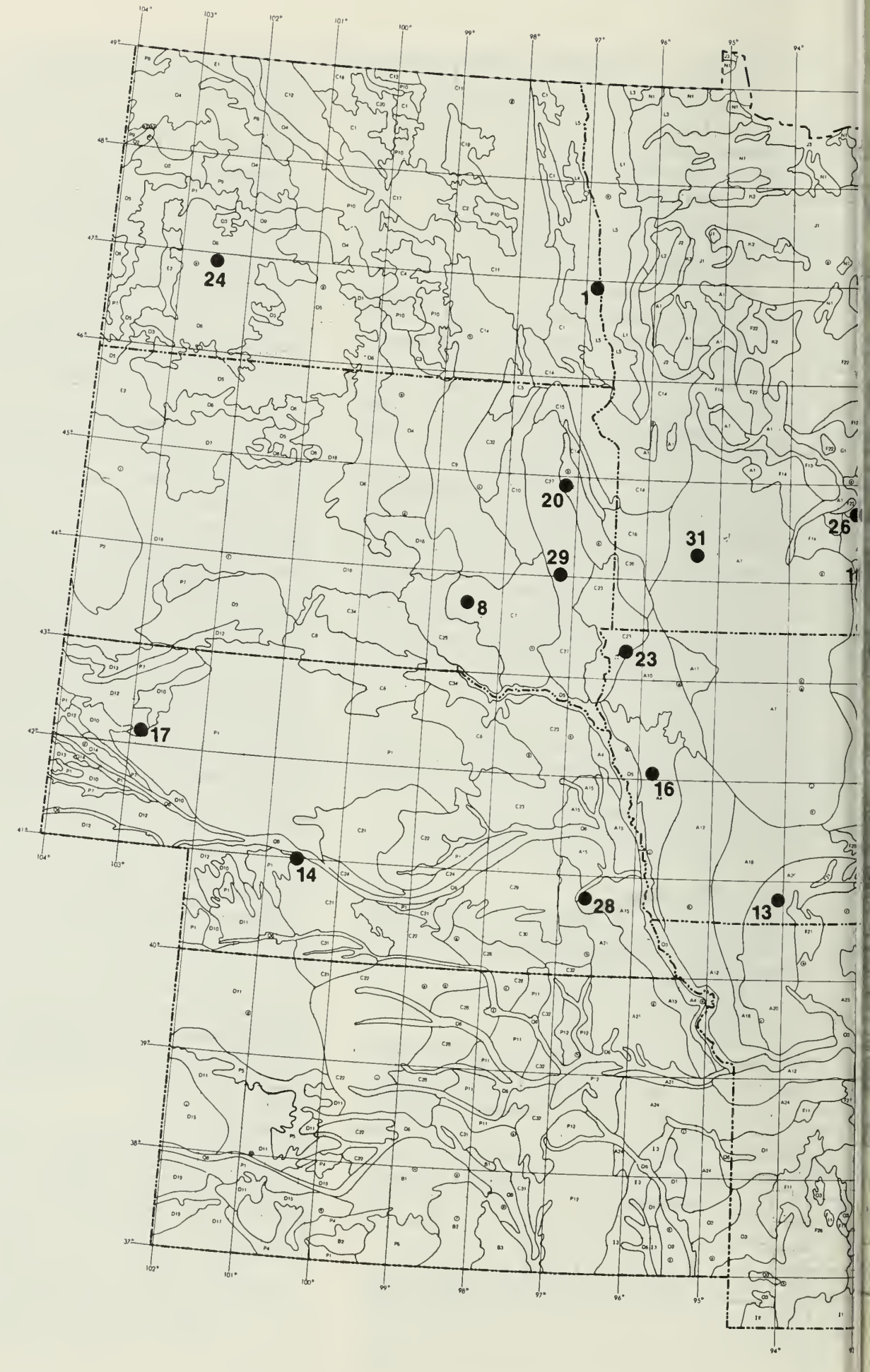
Of the 11 states that participated in the standard tests, 10 were able to make tests on all 3 soils recommended for them; the other state made tests on 2 of the 3 soils recommended for it. In all, 108 infiltration tests were recommended for each participating state. However, because of time limitations and sometimes because of natural phenomena such as thunderstorms, some states were unable to conduct tests on all three soil/crop cover conditions and on all replicates and duplicates. As a minimum, all participating states were able to complete some tests on one of the cover conditions of corn and on a grass so that these two widely different crop cover conditions could be compared for 32 soils. The number of states completing tests on both cultivation and cover conditions of corn was large enough to give an indication of the effect of this variation on infiltration rates.

Since a primary objective of the research was to obtain field values of relative infiltration rates that could be applied by workers in action agencies, the wet-run equilibrium rate data are summarized and analyzed first on a state-by-state basis. This approach permits the scientists concerned to discuss the limitations or peculiarities of the state's data. Second, selected summaries of the data from all of the states are presented. Finally, there is discussion of the limitations of the data and of other studies that might be undertaken.

### Standard Test Data

The data for both the initial test (dry run) and the test 24 hours later (wet run) are shown in alphabetical order by soil type in Appendix A, Appendix Table 1 for corn seedbed, Appendix Table 2 for clipped bromegrass or other appropriate grass, and Appendix Table 3 for corn after cultivation. (See Table of Contents for how to obtain Appendixes if desired.)

Appendix A reports antecedent moisture content at the 0 to 6-inch depth, the water application rate, the time from the start of a test until the start of runoff from the plot, the average infiltration rate at selected time intervals, and the equilibrium rate. Duration of the

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Location of infiltration test sites in each state. See page 8 for identification of soil type at each site. (Fig. 5)

tests varied since tests were to continue until an equilibrium infiltration rate was maintained for approximately 15 minutes. Appendix C reports measurements of soil and water temperatures and antecedent moisture content at various depths in the profile.

Because the soil was the major variable throughout the region, extensive data were taken to describe each site. Appendix B gives a complete profile description as well as the particle size distribution, bulk density, and moisture-release values for each horizon. Most states made all their measurements for a particular soil at one site; some states, however, made tests at different sites and thus have two or more sets of data for a particular soil. Also, some states made measurements in more than one year, so bulk densities may be reported more than once.

### Summary and Analysis by State — Standard Tests

The equilibrium infiltration rate data compiled in each state are summarized in the following pages for each crop cover condition for each soil type by replicate and duplicate to show the variability in the data. The data are then analyzed using an F test with the "experimental error mean square" as the denominator to determine the significance of the variation between the crop cover conditions within a soil type and the interaction between the crop cover conditions and the soils. Sampling error ("dups") is a measure of the variation between duplicates of plots; experimental error is a measure of the failure of differences between crop cover conditions to be equal in all replications.

Many of the states were able to study the three recommended crop cover conditions on the three recommended soils and prepare analyses on them. However, some states were able to complete tests on only two crop cover conditions or some combination of the replicates and duplicates of a crop cover condition, and their analyses are more limited. Some states, moreover, had to make substitutions for crop cover conditions. Thus, although most analyses used the same statistical procedures, there is some variation from state to state. The variations are footnoted on the summary table for each state.

## Alaska

*(N. E. Michaelson)*[1]

Alaska conducted tests on Bodenburg silt loam, Knik silt loam, and Minto silt loam (Table 1). These soils were developed from loessial deposits of high silt content in broad stream valleys of central and south-central Alaska.

Alaska completed tests on two crop cover treatments — bromegrass and a substitute for corn seedbed — on its three soils. Since corn is not commonly grown in Alaska, a tilled fallow soil that had been cultivated at least the two previous years was selected as the substitute treatment.

**Results.** The analysis of the data for Bodenburg has the peculiarity that the experimental error equals

[1] Investigator.

*Table 1. ALASKA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | |
|---|---|---|---|---|---|---|
| | Fallow[a] | | | Bromegrass | | |
| | Bodenburg | Knik | Minto | Bodenburg | Knik | Minto |
| 1–1 | .4 | .3 | .5 | .6 | .2 | .5 |
| 1–2 | .7 | .2 | .3 | .2 | .4 | .5 |
| 2–1 | .5 | .3[b] | .4 | .6 | .6 | .3 |
| 2–2 | .6 | .3 | .4 | .3[b] | .5 | .4 |
| 3–1 | .4 | .4 | .4 | .4 | .2 | .4 |
| 3–2 | .5 | .6 | .4 | .3 | .4 | .4 |
| Mean | .51 | .35 | .40 | .40 | .38 | .42 |

Analysis of variance — individual soils

| Source | DF | Bodenburg MS | Bodenburg F | Knik MS | Knik F | Minto MS | Minto F |
|---|---|---|---|---|---|---|---|
| Reps | 2 | .010 | | .025 | | .005 | |
| Crop cover | 1 | .040 | ∞ | .010 | .20 | .000 | .00 |
| Exp. error | 2 | .000 | | .050 | | .012 | |
| Dups | 6 | .030 | | .011 | | .004 | |
| Total | 11 | | | | | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | .030 | 1.5 |
| Reps within soils | 6 | .013 | .65 |
| Crop cover | 1 | .010 | .50 |
| Soils × cover | 2 | .015 | .75 |
| Experimental error | 6 | .020 | |
| Dups within soils | 18 | .015 | |
| Total | 35 | | |

[a] Second-year fallow following cultivation.
[b] Calculated missing value.

zero. The resulting F value thus equals infinity, indicating that the differences would be highly significant. However, if the duplicates' mean square is substituted for the denominator in the F test, as was suggested by some statisticians, none of the differences is significant.

In all the other analyses for effects of crop cover and soils and their interactions, the differences are not significant.

All three soils — Bodenburg, Knik, and Minto silt loams — had the same mean equilibrium infiltration rate, 0.4 inch per hour, irrespective of cover conditions.

## Illinois

*(B. A. Jones, Jr., and G. D. Bubenzer)*

Illinois conducted tests on Cisne silt loam, Elliott silt loam, and Flanagan silt loam soils (Table 2). Cisne soils developed on broad Illinoian till plains with a thin loess cover. They are on nearly level areas of southern Illinois and adjoining states. The native vegetation was probably prairie grasses and widely spaced trees. Cisne is poorly drained, and the permeability is very slow.

Elliott soils developed on calcareous silty clay loam or clay loam glacial till of Wisconsinan age. In many places they have a mantle of less than 18 inches of silty glacial drift or loess. The native vegetation was prairie grass. Elliott is somewhat poorly drained, and permeability is moderately slow. (Elliott is associated with the timber soil Blount, which was tested by Ohio.)

Flanagan soils developed on calcareous till or lakebed sediments of Wisconsinan age overlain by 40 to 60 inches of loess. The native vegetation was prairie grass. The soils are somewhat poorly drained, and permeability is moderate. (Grundy silt loam, tested by Iowa, is in an associated series.)

**Results.** Because of equipment failures and unexpected thunderstorms during tests, Illinois was not able to complete all of the standard tests. To have sufficient data for analysis of Cisne, data from two experiment fields were pooled; study showed that there was no significant difference between equilibrium infiltration rates at the two fields.

Bromegrass plots were available for tests on Cisne, but Kentucky bluegrass plots had to be substituted on Flanagan and alfalfa on Elliott. Finally, complete tests were not performed on Cisne with corn after cultivation.

To get a comparison of all soils and all treatments, the data common to all soils were treated as three replicates without duplicates. These analyses (Table 2) showed that there was a highly significant difference in the equilibrium infiltration rates of the three soils: Flanagan had the highest rate, Elliott was intermediate, and Cisne was the lowest. The differences because of the crop cover condition were also highly significant, probably as a result of the extremely high rates for the bluegrass sod on Flanagan. Tests on red clover/alfalfa plots on Flanagan soil in an adjacent county resulted in a mean value less than one-half of the one on bluegrass sod.

The crop cover/soil interaction was significant at the 5-percent level. This again was in large part probably because of the Flanagan bluegrass sod soil condition.

*Table 2. ILLINOIS: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| | Infiltration rate (inches per hour) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | | Corn cultivated | | |
| Plot (rep.-dup.) | Cisne[a] | Elliott | Flanagan | Cisne[a] | Elliott (alfalfa) | Flanagan (bluegrass) | Cisne[c] | Elliott | Flanagan |
| 1–1 | .4 | 1.0 | 2.1 | .4 | 1.9 | 3.4 | | .4 | 2.8 |
| 1–2 | .4 | 1.6 | .8 | 1.2 | 1.4 | 3.3 | .5 | .7 | 1.0 |
| 2–1 | .5[b] | 1.2 | 1.5 | .6 | 1.4 | 4.3 | | 1.5 | 2.8 |
| 2–2 | .5 | 2.1 | 2.4 | 1.0 | 2.0[b] | 3.3 | .6 | 1.6 | 1.5 |
| 3–1 | .7 | | .7 | .5[b] | | 4.1 | | | 1.9[b] |
| 3–2 | 1.1 | | 3.5 | .3 | | 3.5 | .4 | | 2.1[b] |
| Mean | .60 | 1.47 | 1.83 | .67 | 1.68 | 3.65 | .50 | 1.05 | 2.02 |

Analysis of variance — individual soils

| | Cisne | | | Elliott | | | Flanagan | | |
|---|---|---|---|---|---|---|---|---|---|
| Source | DF | MS | F | DF | MS | F | DF | MS | F |
| Reps | 2 | .005 | | 1 | .40 | | 2 | .32 | |
| Crop cover | 1 | .02 | .08 | 4 | .60 | 2.00 | 2 | 6.00 | 150.00** |
| Exp. error | 2 | .24 | | 4 | .30 | | 4 | .04 | |
| Dups | 6 | .083 | | 10 | .14 | | 9 | .93 | |
| Total | 11 | | | 19 | | | 17 | | |

Combined analysis — all soils (uses data common to all soils, treated as 3 reps, no dups)

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | 8.87 | 29.6** |
| Reps within soils | 9 | .15 | .5 |
| Crop cover | 2 | 3.03 | 10.1** |
| Soils × cover | 4 | 1.18 | 3.9* |
| Experimental error | 9 | .30 | |
| Total | 26 | | |

[a] Pooled values — Brownstown and Toledo.
[b] Calculated missing value.
[c] Toledo only; not used in analysis of individual soils.

* Significant at the 5-percent level.
** Significant at the 1-percent level.

Analysis of differences within individual soils showed no significant differences for crop cover except on Flanagan.

Irrespective of cover condition, the mean equilibrium infiltration rate for Cisne was 0.6 inch per hour; for Elliott, 1.5 inches per hour. Under clean-tilled conditions, Flanagan had a rate of 1.9 inches per hour; under long-term sod, the rate was 3.6 inches per hour.

### Indiana
*(D. Wiersma)*

Indiana conducted tests on Cincinnati silt loam, Clermont silt loam, and Russell silt loam (Table 3). Cincinnati soils developed in 18 to 40 inches of loess overlying Illinoian glacial till. The native vegetation was deciduous mixed hardwood trees. The soils are well drained and the permeability is moderate.

Clermont silt loam was developed in 20 to 48 inches of loess over Illinoian till of loam or clay loam texture. The native vegetation was deciduous mixed trees. The soils are poorly drained and have very slow or slow permeability. These soils are sometimes found in association with Cincinnati.

Russell silt loam is also a forest soil found on moraines, knolls, and ridges and along streams dissecting Wisconsinan-age till plains that have a cap of loess. The soils are well drained and have moderate permeability on the surface, grading to moderately slow in the C horizon.

**Results.** All the soils were very similar in texture, Russell having slightly higher clay content in the surface 1 foot. Previous management of the three soils varied. Russell had been continuously row-cropped for several seasons before the experiment; Clermont also had been cultivated but not as intensively as Russell; Cincinnati had been previously in pasture with an excellent growth of grass. No attempt was made to measure soil structure or the stability of the soil structure. Such a measurement may have given a clue to the difference in the observed infiltration rates.

Since Indiana was one of the first states to test the infiltrometer, only 1-year stands of bromegrass were available. Although there was a good growth of grass on all the plots, the 1-year period may not have been sufficient to produce the maximum effect.

Statistically, there was a highly significant difference in the infiltration rates among the soil types (Table 3). Generally, the infiltration rate was highest for all soils in the corn cultivated crop cover condition. There was no observed difference in infiltration rates between the corn seedbed and the bromegrass cover condition, although normally a difference would be expected; however, the bulk density of the surface soil of the bromegrass was notably higher than that of the corn seedbed, which may account for the lower infiltration rate.

The mean equilibrium infiltration rates for Cincinnati, Clermont, and Russell were 1.1, 0.8, and 0.5 inch per hour, respectively, regardless of cover condition.

### Iowa
*(M. Amemiya and W. E. Larson)*

Iowa conducted tests on Grundy, Ida, and Moody silt loams on the corn seedbed and bromegrass cover conditions (Table 4).

Grundy silt loam was formed in Wisconsinan-age loess underlain by Kansan and Nebraskan till. The native vegetation was prairie grass. The soils are somewhat poorly drained, and permeability is slow. (Grundy is associated with Sharpsburg, which was tested by Nebraska.)

Ida silt loam is a deep, calcareous, silty soil formed in loess on uplands. The native vegetation was short and tall prairie grasses. The soils are well drained, and permeability is moderate.

Moody soils were formed in friable silty loess on uplands. The native vegetation was prairie grasses. The soils are well drained, and permeability is moderate to moderately slow.

**Results.** Infiltration runs on the Ida and Moody soils were made without operational problems. However, on the Grundy soil, the infiltration rates recorded are questionable because of lateral flow above the highly impermeable B horizon. It was observed during the runs that the applied water percolated downward to the B horizon and then began to move laterally from the site of application instead of down into the profile. Thus, values reported for Grundy soil are in excess of actual infiltration into the profile.

The statistical analysis shows a significant difference in the infiltration rates on Ida under the two cover conditions. The difference on Moody is significant at the 10-percent level but not at the 5-percent level used in most of the comparisons. The rates on Grundy were essentially the same under the two cover conditions, which may be related to the lateral flow condition mentioned before.

The combined analysis shows significant differences between the cover conditions and the soil/cover interaction.

The mean equilibrium infiltration rate for Grundy was 1.1 inches per hour under the clean-tilled and grass cover conditions. Under the clean-tilled conditions, Ida and Moody had mean infiltration rates of 0.7 and 0.4 inch per hour, respectively; under grass cover, the rates were 1.5 and 1.4 inches per hour, respectively.

### Michigan
*(A. E. Erickson)*

Michigan conducted tests on all three cover conditions on Emmet loamy sand, Miami sandy loam, and Sims loam (Table 5). All of these soils developed on calcareous glacial till of Wisconsinan age with mixed forest as the native vegetation. Emmet soils formed in sandy loam material on moraines, drumlins, and till plains. The soils are well or moderately well drained, and the permeability is moderate.

*Table 3. INDIANA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | | Corn cultivated | | |
| | Cincinnati | Clermont | Russell | Cincinnati | Clermont | Russell | Cincinnati | Clermont | Russell |
| 1–1 | 1.2 | .8 | .5 | 1.1 | .4 | .5 | 1.4 | 1.2 | .6 |
| 1–2 | 1.2 | .9 | .5 | 1.2 | .6 | .7 | 1.2 | 1.2 | .6 |
| 2–1 | 1.2 | .1 | .5 | .8 | 1.0 | .4 | .6 | 1.1 | .6 |
| 2–2 | .8 | .1 | .4 | .9 | 1.0 | .3 | 1.1 | 1.1 | .8 |
| 3–1 | 1.4 | 1.2 | .7 | 1.2 | .5 | .5 | 1.1 | .6 | .6 |
| 3–2 | 1.4 | .4 | .5 | 1.3 | .5 | .4 | 1.4 | 1.1 | .6 |
| Mean | 1.20 | .58 | .52 | 1.08 | .67 | .47 | 1.13 | 1.05 | .63 |

Analysis of variance — individual soils

| Source | DF | Cincinnati MS | Cincinnati F | Clermont MS | Clermont F | Russell MS | Russell F |
|---|---|---|---|---|---|---|---|
| Reps | 2 | .265 | | .030 | | .005 | |
| Crop cover | 2 | .020 | 2.00 | .370 | 1.33 | .045 | 2.04 |
| Exp. error | 4 | .010 | | .278 | | .022 | |
| Dups | 9 | .031 | | .052 | | .009 | |
| Total | 17 | | | | | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | 1.32 | 13.33** |
| Reps within soils | 6 | .215 | 2.17 |
| Crop cover | 2 | .210 | 2.12 |
| Soils × cover | 4 | .122 | 1.23 |
| Experimental error | 12 | .099 | |
| Dups within soils | 27 | .031 | |
| Total | 53 | | |

** Significant at the 1-percent level.

*Table 4. IOWA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | |
|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | |
| | Grundy | Ida | Moody | Grundy | Ida | Moody |
| 1–1 | 2.7 | .2 | .2 | 2.1 | 1.0 | 1.3 |
| 1–2 | 1.2 | .2 | .1 | .8 | 1.5 | 1.2 |
| 2–1 | .9 | .7 | .2 | .4[a] | 1.3 | 2.7 |
| 2–2 | .5 | 1.7 | .9 | .6 | 2.4 | 1.4 |
| 3–1 | 1.2 | 1.2 | .4 | .1 | 2.0 | .5 |
| 3–2 | .4 | .3 | .3 | 1.9 | .9 | 1.2 |
| Mean | 1.15 | .72 | .35 | .98 | 1.52 | 1.38 |

Analysis of variance — individual soils

| Source | DF | Grundy MS | Grundy F | Ida MS | Ida F | Moody MS | Moody F |
|---|---|---|---|---|---|---|---|
| Reps | 2 | 1.30 | | .64 | | .58 | |
| Crop cover | 1 | .09 | .75 | 1.92 | 38.40* | 3.21 | 12.84 |
| Exp. error | 2 | .12 | | .05 | | .25 | |
| Dups | 6[b] | .80 | | .37 | | .23 | |
| Total | 11 | | | | | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | .21 | 1.50 |
| Reps within soils | 6 | .84 | 6.00* |
| Crop cover | 1 | 2.78 | 19.86* |
| Soils × cover | 2 | 1.22 | 8.71 |
| Experimental error | 6 | .14 | |
| Dups within soils | 17 | .45 | |
| Total | 34 | | |

[a] Calculated missing value.
[b] 5 for Grundy.

* Significant at the 5-percent level.

Miami soils were formed from loam glacial till. They are well drained and moderately permeable.

Sims soils were formed on till plains and the lower parts of low moraines. They are poorly to very poorly drained, and permeability is slow. They are very plastic when wet and form deep cracks when dry.

**Results.** The analysis of crop cover for the individual soils showed no significant differences for Emmet and Miami soils. For Sims there was a significant difference between the equilibrium infiltration rate for corn seedbed and for bromegrass and cultivated corn.

The combined analysis showed a significant difference among the soils but no interaction of the effects of crop cover and soils.

The differences in infiltration rates among the soils are due to differences in structure and stability of the surface soils during the course of the growing season. Sims, which has the capacity to develop a reasonably stable structure, developed deep cracks into the subsoil by midsummer. Thus, it had a higher infiltration capacity than would be expected since it has the finest texture. Both Emmet and Miami soils have a weak structure that crusts but is less subject to cracking or drying. These two soils had lower wet-run equilibrium infiltration rates than Sims; the finer textured Miami soils had the lowest.

The Sims soil corn seedbed condition had the lowest infiltration rate — at the time of the tests, the subsurface and subsoil had not dried sufficiently from the wet winter and spring to crack and let water percolate through the soil. Once the soil cracked, the infiltration rate doubled and this soil, which had the lowest infiltration rate early in the year, had the highest rate later in the year. In contrast, Emmet and Miami soils with their unstable surfaces crusted quickly and did not change significantly with the cropping practices or time of the season.

The mean equilibrium infiltration rates for Emmet and Miami, regardless of cover, were 1.5 and 1.2 inches per hour, respectively. The mean equilibrium value for Sims under tilled conditions was 1.1 inches per hour; under a grass cover the mean rate was 2.5 inches per hour.

## Minnesota
*(R. H. Rust)*

Minnesota tested Kenyon and Port Byron silt loams and Webster clay loam (Table 6). Kenyon soils formed in loam surficial sediment overlying glacial till. The native vegetation was tall prairie grass. Drainage is moderate to well drained, and permeability is moderately slow.

Port Byron was formed in valleys and on high terrace positions in deep loess landscapes. The native vegetation was prairie grass. The soils are well and moderately well drained, and permeability is moderate.

Webster soils formed in glacial sediments and till on uplands. The native vegetation was tall prairie grass and marsh bunchgrasses. The soils are poorly drained, and permeability is moderate or moderately slow.

**Results.** Tests were completed on bromegrass on all three soils. Corn seedbed was tested on Webster, and corn after cultivation was tested on Kenyon and Port Byron. In the statistical analysis (Table 6) Kenyon data were used without substitution for missing data.

*Table 5. MICHIGAN: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | | Corn cultivated | | |
| | Emmet | Miami | Sims | Emmet | Miami | Sims | Emmet | Miami | Sims |
| 1–1 | 3.5 | 1.4 | .7 | 1.8 | .9 | 2.2 | 1.8 | .5 | 1.7 |
| 1–2 | .3 | 1.5 | .9 | 3.3 | .5 | 3.3 | .3 | .8 | 1.7 |
| 2–1 | 2.2 | .3 | .8 | 1.1 | 2.6 | 2.1 | 1.2 | .9 | 1.3 |
| 2–2 | 1.0 | 2.5 | 2.5 | 1.0 | .5 | 2.6 | 1.0 | .8 | 3.7 |
| 3–1 | 1.4 | .8 | .7 | 2.2 | 2.0 | 2.0 | 1.8 | 2.1 | 3.5 |
| 3–2 | .6 | .9 | 1.2 | .7 | 1.3[a] | 2.8 | 1.5 | 1.0 | 1.5 |
| Mean | 1.5 | 1.2 | 1.1 | 1.7 | 1.3 | 2.5 | 1.3 | 1.0 | 2.2 |

Analysis of variance — individual soils

| Source | DF | Emmet MS | Emmet F | Miami MS | Miami F | Sims MS | Sims F |
|---|---|---|---|---|---|---|---|
| Reps | 2 | .55 | | .30 | | .30 | |
| Crop cover | 2 | .25 | .38 | .15 | .33 | 3.20 | 10.00* |
| Exp. error | 4 | .65 | | .45 | | .32 | |
| Dups | 9 | 1.07 | | .62 | | .83 | |
| Total | 17 | | | | | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | 2.70 | 4.82* |
| Reps within soils | 6 | .38 | .67 |
| Crop cover | 2 | 1.30 | 2.32 |
| Soils × cover | 4 | .88 | 1.57 |
| Experimental error | 12 | .56 | |
| Dups within soils | 27 | .84 | |
| Total | 53 | | |

[a] Calculated missing value.

* Significant at the 5-percent level.

In the combined analysis for all soils, corn was treated without regard to tillage variation, and values were calculated for missing data.

In the individual soil analyses, there were no significant differences among the cover conditions. The difference for Port Byron was intermediate between the 5- and 10-percent level of significance.

In the combined analysis there was a significant difference in the soil/crop cover interaction. This likely results from the pooling effect of the differences on both Webster and Port Byron, which were greater than those on Kenyon.

That the infiltration rates on Kenyon and Webster were the same or higher under corn than under bromegrass was, perhaps, contrary to expectation. It would appear that the plow layer is the critical horizon on these soils with regard to infiltration, and two or three years of brome sod did not produce a more porous surface horizon (with stability) than did the usual tillage associated with corn.

The three soils tested in Minnesota are all dark colored and are generally considered permeable so that significantly different infiltration rates might not be expected. On the other hand, the coefficient of variation in the measurements was rather high — about 25 percent — illustrating that field measurements of a dynamic natural physical process, such as infiltration, are not very precise, largely because of the inherent variation in the natural elements of the system.

The mean equilibrium infiltration rate, irrespective of cover, was 1.3 inches per hour for Kenyon. Under clean-tilled conditions the rate was 0.5 for Port Byron and 1.0 for Webster. Under grass cover the rate was 2.0 for Port Byron and 0.6 for Webster.

## Nebraska
*(H. D. Wittmuss)*

Nebraska tested Holdrege silt loam, Keith very fine sandy loam, and Sharpsburg silty clay loam soils (Table 7). Holdrege soils were formed on uplands in silt loam calcareous loess. The native vegetation was mixed prairie grasses. The soils are well drained, and permeability is moderate. Much of this soil is irrigated for cropping.

Keith soils were formed on uplands and terraces in loess. The native vegetation was mixed prairie grasses. The soils are well drained, and permeability is moderate.

Sharpsburg soils formed in loess on upland divides and stream benches. The native vegetation was tall prairie grasses. The soils are moderately well drained, and permeability is moderately slow.

**Results.** Only three replicate and no duplicate measurements were made on Holdrege and Keith soils under two cover conditions. For Keith soil, a fallow condition was substituted for the corn seedbed, and intermediate wheatgrass was substituted for bromegrass. Four replicate and no duplicate tests were made on Sharpsburg. In the analysis of variance, all four tests on Sharpsburg were used for the individual analysis, but only replicates 1, 2, and 3 were used in the combined analysis.

The analysis of variance showed no significant differences in the equilibrium infiltration rates for the two cover conditions for Holdrege and Sharpsburg. There was a highly significant difference between the cover conditions for Keith very fine sandy loam because Keith soil often forms a surface crust under bare conditions.

The combined analysis showed no significant differences for the cover conditions and the interactions.

Under bare or grass cover conditions the equilibrium infiltration rate for Holdrege silt loam was 1.2 inches per hour and for Sharpsburg silty clay loam, 1.3 inches per hour. For Keith very fine sandy loam the rate was 0.7 inch per hour for bare conditions and 1.5 for grass cover conditions.

## North Dakota
*(G. E. Wilkinson)*

North Dakota tested Bearden silty clay loam and Morton loam (Table 8). Bearden soils were formed in calcareous silt loam and silty clay loam glacial lake sediments. The native vegetation was a variety of prairie grasses. The soils are somewhat poorly drained, and the permeability is slow to moderate.

Morton soils were formed from weathered soft calcareous silty shales, siltstones, and fine grained sandstones. The native vegetation was medium length and short prairie grasses. The soils are well drained, and permeability is moderate.

**Results.** Tests were completed on Morton for the two tillage conditions for corn and with crested wheatgrass substituted for bromegrass. The wheatgrass was in its seventh year, while the corn was second year following a corn/small grain rotation. The equilibrium infiltration rate on the crested wheatgrass was 2½ to 3 times higher than that on corn (Table 8), but the statistical analysis showed that this difference was significant only at the 10-percent level. This result is in contrast to an earlier published report, which found the cover condition to be highly significant when a different statistical approach was used.

Only three replicates were completed on both corn seedbed and bromegrass on Bearden. The bromegrass was in its eighth year, while the corn was first year following two years of wheat with a corn and wheat cropping sequence preceding that. The difference in infiltration rates on bromegrass and on corn was significant at the 5-percent level.

The combined analysis of variance used corn seedbed only for the Morton soil with the mean of a set of duplicates for each replicate used as single replicate values. The analysis showed a significant difference for the crop cover condition.

*Table 6. MINNESOTA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | |
|---|---|---|---|---|---|---|
| | Corn seedbed | Bromegrass | | Corn cultivated | | |
| | Webster | Kenyon | Port Byron | Webster | Kenyon | Port Byron |
| 1–1 | .8 | 1.4 | 2.3 | .7 | .8 | .4 |
| 1–2 | 1.0 | 1.3 | 2.5 | .4 | .8 | .4 |
| 2–1 | 1.0 | .5 | 1.5 | .5 | 1.5 | .9 |
| 2–2 | .7 | 1.8 | 1.4 | 1.0 | 2.6 | .6 |
| 3–1 | 1.4 | 1.5[a] | 1.8 | .4 | .6[a] | .5 |
| 3–2 | .9 | 1.6[a] | 2.2 | .6 | 1.2[a] | .4 |
| Mean | 1.0 | 1.2 | 2.0 | .6 | 1.4 | .5 |

Analysis of variance — individual soils

| Source | Kenyon DF | Kenyon MS | Kenyon F | Port Byron DF | Port Byron MS | Port Byron F | Webster DF | Webster MS | Webster F |
|---|---|---|---|---|---|---|---|---|---|
| Reps | 1 | .55 | | 2 | .09 | | 2 | .01 | |
| Crop cover | 1 | .06 | .06 | 1 | 6.02 | 13.68 | 1 | .41 | 5.46 |
| Exp. error | 1 | 1.06 | | 2 | .44 | | 2 | .075 | |
| Dups | 4 | .36 | | 6 | .27 | | 6 | .063 | |
| Total | 7 | | | 11 | | | 11 | | |

Combined analysis — all soils[b]

| Source | DF[c] | MS | F |
|---|---|---|---|
| Soils | 2 | .96 | 2.16 |
| Reps within soils | 5 | .16 | .36 |
| Crop cover | 1 | .52 | 1.17 |
| Soils × cover | 2 | 3.12 | 7.03* |
| Experimental error | 5 | .444 | |
| Dups within soils | 16 | .136 | |
| Total | 31 | | |

[a] Calculated missing value, not used in analysis of individual soils.
[b] All corn treated as one cover condition.
[c] Reduced for missing data.
* Significant at the 5-percent level.

*Table 7. NEBRASKA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | |
|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | |
| | Holdrege | Keith[a] | Sharpsburg | Holdrege | Keith[b] | Sharpsburg |
| 1–1 | .7 | .4 | 1.2 | 1.4 | 1.3 | 1.8 |
| 2–1 | 1.2 | 1.2 | 2.2 | 1.5 | 2.0 | 1.0 |
| 3–1 | 1.7 | .4 | .6 | .5 | 1.2 | 1.7 |
| 4–1 | | | 1.1 | | | .9 |
| Mean | 1.20 | .70 | 1.28 | 1.13 | 1.50 | 1.35 |

Analysis of variance — individual soils (all values treated as replicates, no duplicates)

| Source | Holdrege DF | Holdrege MS | Holdrege F | Keith MS | Keith F | Sharpsburg DF | Sharpsburg MS | Sharpsburg F |
|---|---|---|---|---|---|---|---|---|
| Reps | 2 | .05 | | .80 | | 3 | .16 | |
| Crop cover | 1 | 0 | 0 | 1.04 | 208.00** | 1 | .01 | .02 |
| Exp. error | 2 | .50 | | .005 | | 3 | .51 | |
| Total | 5 | | | | | 7 | | |

Combined analysis — all soils (used 3 replicates for Sharpsburg)

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | .18 | .35 |
| Reps within soils | 6 | .25 | .48 |
| Crop cover | 1 | .43 | .83 |
| Soils × cover | 2 | .33 | .63 |
| Experimental error | 6 | .52 | |
| Total | 17 | | |

[a] Fallow.
[b] Wheatgrass.
** Significant at the 1-percent level.

With a bare soil the mean equilibrium infiltration rate for Bearden was 0.2 inch per hour, and for Morton it was 0.4 inch per hour. With a grass cover, the mean equilibrium rate for Bearden increased to 0.9 inch per hour; for Morton it increased to 1.0 inch per hour.

## Ohio

*(B. L. Schmidt and D. M. Van Doren, Jr.)*

Ohio conducted standard tests on Blount silty clay loam, Canfield silt loam, and Hoytville clay soils (Table 9). Blount soils developed from highly calcareous late Wisconsinan silty clay loam or clay loam glacial till. They occur on nearly level areas of till plains in northwestern and western Ohio and several adjoining states. The native vegetation was hardwood forest. (Among other soils, Blount is associated with Elliott, which was developed under adjacent prairie conditions; Elliott was tested by Illinois.) Blount is somewhat poorly drained and has slow to moderately slow permeability.

Canfield soils developed from late Wisconsinan loam glacial till composed mainly of sandstone and shale material. They occur on nearly level to gently sloping till plains. The native vegetation was deciduous forest. A fragipan greatly affects Canfield's permeability, which is classified as moderate above the fragipan and slow in it. The soil is moderately well drained.

Hoytville soils developed from clay or silty clay calcareous late Wisconsinan glacial till on nearly level lake plains in northwestern Ohio. The native vegetation was deciduous swamp forest with some marsh grasses. Hoytville is very poorly drained and has moderately slow permeability in the substratum.

**Results.** On the Blount silty clay loam, there were no significant differences in the equilibrium infiltration rates among the three crop cover conditions (Table 9). On Canfield, a light-colored silt loam with weak surface structure susceptible to surface sealing and crusting from raindrop impact, the bromegrass plots had significantly higher equilibrium infiltration rates than either bare-surfaced corn treatment. On the heavy-textured lakebed soil, Hoytville clay, the corn seedbed and bromegrass plots had higher equilibrium rates than the corn after cultivation, but these differences did not prove to be statistically significant.

The combined analysis shows that Hoytville and Canfield soils had significantly higher infiltration rates than Blount silty clay loam. This may be partially because of the lower clay content and better drainage of the Canfield profile and because of the cracking in Hoytville soil even after wetting. The analysis also indicated significant differences among crop cover conditions, with the corn seedbed having much higher rates on Hoytville than on the other soils, and bromegrass having much lower rates on the Blount than on the other soils. All soils showed almost the same infiltration rates for cultivated corn. The crop cover/soil interaction did not show a statistically significant difference, however.

The mean equilibrium rate for Blount, irrespective of the cover, was 0.3 inch per hour. For Canfield and Hoytville, under bare corn seedbed conditions when the soils would be subject to surface sealing from water impact, values of 0.4 and 1.0 inch per hour, respectively,

*Table 8. NORTH DAKOTA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | |
|---|---|---|---|---|---|
| | Corn seedbed | | Bromegrass | | Corn cultivated |
| | Bearden | Morton | Bearden | Morton[a] | Morton |
| 1–1 | .3 | .6 | .9 | .7 | .3 |
| 1–2 | | .4 | | .9 | .4 |
| 2–1 | .1 | .3 | .9 | 1.5 | .4 |
| 2–2 | | .2 | | 1.4 | .6 |
| 3–1 | .2 | .5 | 1.0 | .5 | .3 |
| 3–2 | | .2 | | 1.0 | .7 |
| Mean | .20 | .36 | .93 | 1.00 | .45 |

Analysis of variance — individual soils

| Source | Bearden[b] DF | MS | F | Morton DF | MS | F |
|---|---|---|---|---|---|---|
| Reps | 2 | .005 | | 2 | .08 | |
| Crop cover | 1 | .80 | 80.00* | 2 | .71 | 5.07 |
| Exp. error | 2 | .01 | | 4 | .14 | |
| Dups | | | | 9 | .04 | |
| Total | 5 | | | 17 | | |

Combined analysis — all soils[b] (used corn seedbed only for Morton)

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 1 | .041 | .53 |
| Reps within soils | 4 | .001 | .016 |
| Crop cover | 1 | 1.40 | 18.16* |
| Soils × cover | 1 | .007 | .10 |
| Experimental error | 4 | .077 | |
| Total | 11 | | |

[a] Crested wheatgrass.
[b] Analyzed as 3 replicates, no duplicates.
* Significant at the 5-percent level.

were measured. After cultivation of the soil surface under corn, however, the mean equilibrium rate for Hoytville also dropped to 0.3 inch per hour, the same as for Canfield. With a grass cover crop, Canfield had a rate of 1.1 inches per hour, while the Hoytville rate was 1.0 inch per hour.

### South Dakota

*(M. L. Horton and Q. S. Kingsley)*

South Dakota conducted tests on Dudley clay loam, Kranzburg silty clay loam, and Sinai silty clay loam soils under cultivated corn and bromegrass cover conditions (Table 10). Dudley soils were formed in calcareous glacial till on upland plains or in swales. Slope gradients are typically less than 3 percent. Native vegetation was grasses, sedges, or forbs. Runoff is slow, and drainage ranges from moderately well drained to poorly drained. Water permeability is slow to very slow.

Kranzburg soils were formed from silty and clay loam glacial till on plains having gentle and uniform slopes, typically with less than 6 percent gradient. The native vegetation was mixed prairie grasses. The soils are well drained, and permeability is moderate.

Sinai soils occur on nearly level to gently sloping uplands. The soils formed in clayey glaciolacustrine sediments of ice-locked lakes. The native vegetation was mixed prairie grasses. The soils are moderately drained to well drained, and permeability is slow or very slow.

**Results.** The analysis of variance for the individual soils (Table 10) showed that the differences between the corn and the bromegrass cover were highly significant on the Sinai soil. For the other two soils, no significant differences were shown. In the combined analysis the crop cover showed a highly significant difference.

Kranzburg is the lightest textured of the three soils and shows no clay accumulation within the profile. Since natural infiltration rates are good, any improved tilth due to the bromegrass would not be expected to significantly improve infiltration rates. Also, Kranzburg generally has twice as much organic matter in the 2- to 4-foot depth as the other South Dakota soils studied. The higher organic matter content may contribute to improved structure.

Dudley soil has only a slightly higher clay content than Kranzburg but does show a slight clay accumulation at the 12-inch depth. Besides having a claypan tendency, this soil tends toward a solonetz. Some improvement in infiltration may be because of improved aggregation under bromegrass; however, any increase in infiltration may be partly offset by dispersion and poor subsoil structure.

The Sinai soil has the highest clay content of the three soils and is generally finer textured throughout the profile. Any improved aggregation due to bromegrass might improve the already low infiltration rate.

Irrespective of the cover, the mean equilibrium infiltration rate on Kranzburg silty clay loam was 0.8 inch per hour. Under a bare soil condition, the rates on Dudley and Sinai were 0.4 and 0.6 inch per hour, respectively. With a grass cover, the rates for these two soils were 1.0 and 1.1 inches per hour, respectively.

*Table 9. OHIO: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | | Corn cultivated | | |
| | Blount | Canfield | Hoytville | Blount | Canfield | Hoytville | Blount | Canfield | Hoytville |
| 1–1 | .2 | .3 | .9 | .2 | 1.3 | .8 | .2 | .1 | .6 |
| 1–2 | .1 | .3 | .3 | .1 | .9 | .2 | .3 | .1 | .4 |
| 2–1 | .6 | .4 | .8 | .4 | 2.1 | .7 | .1 | .4 | .2 |
| 2–2 | .2 | .1 | .7 | .3 | .6 | 2.1 | .4 | .2 | .1 |
| 3–1 | .4 | .3 | 1.7 | .4 | .6 | .8 | .1 | .6 | .4 |
| 3–2 | .5 | 1.0 | 1.8 | .1 | 1.1 | 1.5 | .1 | .6 | .3 |
| Mean | .33 | .40 | 1.03 | .25 | 1.10 | 1.02 | .20 | .33 | .33 |

Analysis of variance — individual soils

| Source | DF | Blount MS | Blount F | Canfield MS | Canfield F | Hoytville MS | Hoytville F |
|---|---|---|---|---|---|---|---|
| Reps | 2 | .035 | | .065 | | .46 | |
| Crop cover | 2 | .025 | .89 | 1.085 | 7.75* | .96 | 2.40 |
| Exp. error | 4 | .028 | | .140 | | .40 | |
| Dups | 9 | .022 | | .182 | | .18 | |
| Total | 17 | | | | | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | 1.320 | 6.88** |
| Reps within soils | 6 | .185 | .96 |
| Crop cover | 2 | 1.140 | 5.94** |
| Soils × cover | 4 | .462 | 2.41 |
| Experimental error | 12 | .192 | |
| Dups within soils | 27 | .128 | |
| Total | 53 | | |

* Significant at the 5-percent level.
** Significant at the 1-percent level.

*Table 10. SOUTH DAKOTA: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | |
|---|---|---|---|---|---|---|
| | Bromegrass | | | Corn cultivated | | |
| | Dudley | Kranzburg | Sinai | Dudley | Kranzburg | Sinai |
| 1–1 | .4 | .5 | 1.5 | .5 | 1.2 | .9 |
| 1–2 | 1.2 | 1.4 | 1.0 | .3 | .6 | .6 |
| 2–1 | .6 | .7 | 1.0 | .7 | 1.0 | .8 |
| 2–2 | .7 | .6 | 1.3 | .2 | .5 | .5 |
| 3–1 | 1.6 | .8 | 1.1 | .3 | 1.0 | .4 |
| 3–2 | 1.4 | .9 | .6 | .6 | .4 | .4 |
| Mean | .98 | .82 | 1.08 | .43 | .78 | .60 |

Analysis of variance — individual soils

| Source | DF | Dudley MS | Dudley F | Kranzburg MS | Kranzburg F | Sinai MS | Sinai F |
|---|---|---|---|---|---|---|---|
| Reps | 2 | .215 | | .05 | | .15 | |
| Crop cover | 1 | .455 | 2.30 | 0 | 0 | .70 | 140.00** |
| Exp. error | 2 | .198 | | .02 | | .005 | |
| Dups | 6 | .089 | .45 | .15 | 7.50 | .063 | 12.00 |
| Total | 11 | | | | | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | .055 | .76 |
| Reps within soils | 6 | .14 | 1.94 |
| Crop cover | 1 | 1.14 | 15.83** |
| Soils × cover | 2 | .235 | 3.26 |
| Experimental error | 6 | .072 | |
| Dups within soils | 18 | .101 | 1.40 |
| Total | 35 | | |

** Significant at the 1-percent level.

## Wisconsin

*(A. E. Peterson and K. A. Kelling)*

Wisconsin tested Fayette and Withee silt loams and Plainfield loamy sand under corn seedbed and bromegrass cover conditions (Table 11).

Fayette soils formed on ridges and high stream terraces in oxidized and leached loess of Wisconsinan age. The native vegetation was deciduous trees. The soils are well drained, and permeability is moderate.

Plainfield soils formed in sandy drift on outwash plains, stream terraces, and glaciated uplands. The native vegetation was forests. The soils are excessively drained, and permeability is rapid.

Withee soils formed in 15 to 30 inches of loess overlying loamy glacial till. The native vegetation was mixed deciduous forest. The soils are somewhat poorly drained, and permeability is moderately slow.

**Results.** Three replicates with duplicates were made on corn seedbed and bromegrass on Withee soil, but only two replicates with duplicates were completed on these crops for Fayette and Plainfield soils. Because of these differences in data, the statistical analysis was made using a completely randomized design.

The analysis of individual soils (Table 11) shows that there were no significant differences between the crop cover conditions on Fayette and Plainfield. There was a highly significant difference for the cover conditions on Withee. In this case the protection of the surface of the soil by the grass had a marked effect on maintaining infiltration.

The combined analysis showed highly significant differences between the soils, a result of the very high infiltration rate for Plainfield compared with the rates for the other two soils. The differences for crop cover were also highly significant, reflecting the differences between Plainfield soil and Fayette and Withee soils.

With bare soil conditions the equilibrium infiltration rate was 0.20 inch per hour on both Fayette and Withee, and 3.7 inches per hour on Plainfield. With grass cover the rate was 0.6, 4.4, and 1.1 inches per hour for Fayette, Plainfield, and Withee, respectively.

*Table 11. WISCONSIN: Wet-Run Equilibrium Infiltration Rates and Statistical Analyses*

| Plot (rep.-dup.) | Infiltration rate (inches per hour) | | | | | |
|---|---|---|---|---|---|---|
| | Corn seedbed | | | Bromegrass | | |
| | Fayette | Plainfield | Withee | Fayette | Plainfield | Withee |
| 1–1 | 0 | 3.7 | 0 | 1.1 | 4.0 | 1.3 |
| 1–2 | 0 | 3.4 | 0 | .5 | 4.4 | 1.1 |
| 2–1 | .8 | 4.7 | .7 | .5 | 4.4 | 1.4 |
| 2–2 | .2 | 2.9 | 0 | .4 | 4.6 | .9 |
| 3–1 | | | 0 | | | .7 |
| 3–2 | | | .6 | | | 1.0 |
| Mean | .25 | 3.67 | .22 | .62 | 4.35 | 1.06 |

Analysis of variance[a]— individual soils

| Source | Fayette | | | Plainfield | | | Withee | | |
|---|---|---|---|---|---|---|---|---|---|
| | DF | MS | F | DF | MS | F | DF | MS | F |
| Crop cover | 1 | .28 | 2.29 | 1 | .91 | 1.85 | 1 | 2.17 | 24.04** |
| Exp. error | 6 | .12 | | 6 | .32 | | 10 | .09 | |
| Total | 7 | | | 7 | | | 11 | | |

Combined analysis — all soils

| Source | DF | MS | F |
|---|---|---|---|
| Soils | 2 | 36.28 | 224.40** |
| Crop cover | 1 | 2.71 | 16.75** |
| Soils × cover | 2 | .13 | .80 |
| Experimental error | 22 | .16 | |
| Total | 27 | | |

[a] Used completely randomized design.

** Significant at the 1-percent level.

*Table 12. Mean Equilibrium Infiltration Rates, in Ascending Order, of Some Major Soils of the North Central Region of the United States, as Measured With a Sprinkling Infiltrometer*

| Tilled surface | | Grass surface | |
|---|---|---|---|
| Soil | Rate | Soil | Rate |
| | (iph) | | (iph) |
| Bearden silty clay loam | .2 | Blount silty clay loam | .3 |
| Fayette silt loam | .2 | Bodenburg silt loam | .4 |
| Withee silt loam | .2 | Knik silt loam | .4 |
| Blount silty clay loam | .3 | Minto silt loam | .4 |
| Hoytville clay | .3 | Russell silt loam | .5 |
| Bodenburg silt loam | .4 | Cisne silt loam | .6 |
| Canfield silt loam | .4 | Fayette silt loam | .6 |
| Dudley clay loam | .4 | Webster clay loam | .6 |
| Knik silt loam | .4 | Clermont silt loam | .8 |
| Minto silt loam | .4 | Bearden silty clay loam | .9 |
| Moody silt loam | .4 | Dudley clay loam | 1.0 |
| Morton loam | .4 | Hoytville clay | 1.0 |
| Port Byron | .5 | Kranzburg silty clay loam | 1.0 |
| Russell silt loam | .5 | Morton loam | 1.0 |
| Cisne silt loam | .6 | Cincinnati silt loam | 1.1 |
| Sinai silty clay loam | .6 | Canfield silt loam | 1.1 |
| Ida silt loam | .7 | Grundy silt loam | 1.1 |
| Keith very fine sandy loam | .7 | Sinai silty clay loam | 1.1 |
| Clermont silt loam | .8 | Withee silt loam | 1.1 |
| Kranzburg silty clay loam | .8 | Holdrege silt loam | 1.2 |
| Webster clay loam | 1.0 | Miami sandy loam | 1.2 |
| Cincinnati silt loam | 1.1 | Kenyon silt loam | 1.3 |
| Grundy silt loam | 1.1 | Sharpsburg silty clay loam | 1.3 |
| Sims loam | 1.1 | Moody silt loam | 1.4 |
| Holdrege silt loam | 1.2 | Elliott silt loam | 1.5 |
| Miami sandy loam | 1.2 | Emmet loamy sand | 1.5 |
| Kenyon silt loam | 1.3 | Ida silt loam | 1.5 |
| Sharpsburg silty clay loam | 1.3 | Keith very fine sandy loam | 1.5 |
| Elliott silt loam | 1.5 | Port Byron silt loam | 2.0 |
| Emmet loamy sand | 1.5 | Sims loam | 2.5 |
| Flanagan silt loam | 1.9 | Flanagan silt loam | 3.6 |
| Plainfield loamy sand | 3.7 | Plainfield loamy sand | 4.4 |

### Summary and Analysis, All States — Standard Tests

When the standard field procedures were first proposed for the regional project, it was envisioned that the data for at least two of the three cover conditions — corn seedbed and grass — would be sufficiently uniform and complete that an extensive analysis could be made to determine the significance of the differences among equilibrium infiltration rates of the major soils tested in the region. But with the lack of uniformity of the data because of substitution of treatments, equipment failures, and thunderstorms, which necessitated calculation of many missing values to have consistent data, this expectation did not materialize. Hence, only generalized summaries and analyses were made.

*Table 13. Alphabetical Listing of Some Major Soils of the North Central Region of the United States and Their Mean Equilibrium Infiltration Rates, as Measured With a Sprinkling Infiltrometer*

| Soil | Rate (inches per hour) Tilled surface | Grass surface | Test location |
|---|---|---|---|
| Bearden silty clay loam | .2 | .9 | N. Dakota |
| Blount silty clay loam | .3 | .3 | Ohio |
| Bodenburg silt loam | .4 | .4 | Alaska |
| Canfield silt loam | .4 | 1.1 | Ohio |
| Cincinnati silt loam | 1.1 | 1.1 | Indiana |
| Cisne silt loam | .6 | .6 | Illinois |
| Clermont silt loam | .8 | .8 | Indiana |
| Dudley clay loam | .4 | 1.0 | S. Dakota |
| Elliott silt loam | 1.5 | 1.5 | Illinois |
| Emmet loamy sand | 1.5 | 1.5 | Michigan |
| Fayette silt loam | .2 | .6 | Wisconsin |
| Flanagan silt loam | 1.9 | 3.6 | Illinois |
| Grundy silt loam | 1.1 | 1.1 | Iowa |
| Holdrege silt loam | 1.2 | 1.2 | Nebraska |
| Hoytville clay | .3 | 1.0 | Ohio |
| Ida silt loam | .7 | 1.5 | Iowa |
| Keith very fine sandy loam | .7 | 1.5 | Nebraska |
| Kenyon silt loam | 1.3 | 1.3 | Minnesota |
| Knik silt loam | .4 | .4 | Alaska |
| Kranzburg silty clay loam | .8 | 1.0 | S. Dakota |
| Miami sandy loam | 1.2 | 1.2 | Michigan |
| Minto silt loam | .4 | .4 | Alaska |
| Moody silt loam | .4 | 1.4 | Iowa |
| Morton loam | .4 | 1.0 | N. Dakota |
| Plainfield loamy sand | 3.7 | 4.4 | Wisconsin |
| Port Byron silt loam | .5 | 2.0 | Minnesota |
| Russell silt loam | .5 | .5 | Indiana |
| Sharpsburg silty clay loam | 1.3 | 1.3 | Nebraska |
| Sims loam | 1.1 | 2.5 | Michigan |
| Sinai silty clay loam | .6 | 1.1 | S. Dakota |
| Webster clay loam | 1.0 | .6 | Minnesota |
| Withee silt loam | .2 | 1.1 | Wisconsin |

In dealing with the data as a whole, the analyses by the states showed that, in 10 of the 13 cases where measurements were made, there were no significant differences in the equilibrium infiltration rates for corn seedbed compared with those for cultivated corn. In the three cases where there were differences, special physical properties of the soils affected cracking of the profile or crusting of the surface. This shows that the changes in soil conditions related to the growth of the corn plant and to one additional trip through the field with machinery are insufficient to justify infiltration measurements under both field conditions.

In about one-half of the tests (14 out of 32) there were differences between the equilibrium rates of a soil under corn seedbed and of the same soil under a grass. No single or small group of physical properties of the soil explains these differences, although many of the properties are affected in part by the protection of the surface by the grass itself.

One likely explanation of why more soils did not have a significantly higher infiltration rate for the bromegrass treatment compared with the corn treatments is that aggregate development in the soils was not altered greatly during the short time the grasses were grown on the test plots. Most of the soils tested had surface horizons relatively high in organic matter and considerable structural stability; such soils do not change rapidly. The Illinois tests on Flanagan silt loam illustrate this point: The grass plots tested had been in bluegrass for several years, and the mean equilibrium infiltration rate on them was more than twice that on similar plots in a short-term legume-grass rotation.

Objectives One and Two of this project were related to determining relative infiltration rates of representative soils. The listings in Table 12 give the mean equilibrium infiltration rates in ascending order for the two major cover conditions tested; Table 13 gives the values for the two cover conditions with the soils listed alphabetically. The analyses by the states showed that, in general, differences of 0.2 or 0.3 inch per hour in the equilibrium infiltration rates were usually not significant. In interpreting the data, therefore, the relative difference between, say, Bearden silty clay loam at 0.2 inch per hour and Blount silty clay loam at 0.3 inch per hour is probably unimportant. But the relative difference between those two soils and, say, Sinai silty clay loam at 0.6 inch per hour or Kranzburg silty clay loam at 0.8 inch per hour is probably real.

### Discussion

A number of other types of analyses could have been made (some of them will be discussed under Objective Three), but without clear insight into the use of the results the Committee decided not to pursue them. For example, an analysis of the "dry"-run equilibrium infiltration rates might be of interest to workers in some action agencies. There are no unique conditions surrounding these data that would preclude such analyses

from being made. However, when faced with a choice of doing "wet"-run or "dry"-run analysis, the Committee concluded that the "wet" run would be more useful.

The Committee also considered the usefulness of plotting the data to produce infiltration rate curves. Perhaps a study of the shape of the curves as the infiltration rates decreased in the early stages of the tests would have been enlightening, but because of limited resources this was not pursued. If such analyses are undertaken, the researcher must recognize that the time from the start of the test until the beginning of the infiltration is meaningless. This time will vary with the amount of surface storage on the test plot, the slope of the plot, the infiltrometer application rate, and the initial infiltration rate. The only thing this datum tells is the length of time required to satisfy all of the physical conditions and have the application rate exceed the infiltration rate. To attempt to use this time interval to make any comparisons between soils or between sites within a soil would be meaningless.

Some questions may be raised on the validity of comparing data taken in different years. One of the states made measurements on its three soils and cover conditions for three successive years to test whether this variable presented problems. There was variability of the data from plot to plot from year to year but no more than between plots for a given year. In the aggregate the data were the same — the means of six values for one soil were 0.63, 0.51, and 0.50 inch per hour for the three years; values for the other two soils showed the same general results.

Other states tested the effect of cropping history on the equilibrium rate, for example, first-year corn versus third-year corn. The differences as a result of the previous history were significant, and it would not be accurate to compare data on cropping without consideration of the previous history.

In summary, it should be emphasized that the results from tests by this sprinkling infiltrometer, which generates data as a result of calculating the difference between the amount of water applied to the soil and the amount of runoff, give rates of water movement in the soil-water-air continuum that are governed by the most limiting element present. This element may be at the surface of the soil or at some other point in the profile. With this in mind, these results may be used to calculate the length of time needed to apply a given amount of water to irrigated land or to calculate one of the subtractions from rainfall when determining a value for surface runoff from an area.

## *OBJECTIVE THREE: To estimate relative infiltration rates from selected soil parameters*

### Theoretical Studies

Studies of soil moisture-flow theory applicable to the unsaturated flow condition of water infiltration were initiated early in the project at the Kansas and Iowa Agricultural Experiment Stations by scientists of the Agricultural Research Service, U.S. Department of Agriculture. The first result of their efforts was the development of a numerical solution to the moisture-flow equation for infiltration in layered soils, as reported by Hanks and Bowers (*6*).

The next results were reported by Green, Hanks, and Larson (*7*), who estimated field infiltration on the basis of a numerical solution to the moisture-flow equation (Hanks and Bowers equation). Their results were based on laboratory and field studies of Ida silt loam, one of the three major soils tested by Iowa scientists. Green, Hanks, and Larson concluded:

> The results indicate that moisture-flow theory may be used, in combination with limited field measurements, to provide estimates of infiltration for simulated conditions that are of practical interest but which are difficult to establish in the field. Such estimates of infiltration are not expected to replace field measurements, but rather to allow a more complete study of infiltration phenomena than would be possible with field measurements alone.

In a third study, the results of which have not been published, Iowa investigators selected two equations of those summarized by Philip (*8*) to test with their field data to express infiltration rates:

(1) $I = (S/2)t^{-1/2} + A$

(2) $I = Bt^{c}$

I is the instantaneous infiltration rate, and t is time. The parameters S/2 and A (Equation 1) and B and c (Equation 2) were determined by least squares analysis by fitting the equations to the experimental data. Equation 1 was derived by Philip from diffusion theory; Equation 2 was developed empirically and has been used widely in infiltration studies (*8*).

The two equations were fitted to the infiltration data and the correlation coefficients for the two equations were compared to see which equation best represented the data. In making the necessary computations, infiltration values limited by rate application were not included.

Of the 71 comparisons made, with only 4 did Equation 2 give a better fit to the experimental data than Equation 1. In 65 of the comparisons, Equation 1 yielded a numerically higher r value, and for 1 measurement the two r values were equal.

For the Ida, Moody, and Grundy soils, respectively, the r values from Equation 1 were 0.89, 0.88, and 0.82; from Equation 2 they were 0.83, 0.81, and 0.77.

To get a more general and, it was hoped, a more applicable equation, an analysis was made on the combined data of the 6 runs on each of 12 combinations of soil

ype, antecedent moisture, and surface condition. This ave 24 solutions, 12 for Equation 1 and 12 for Equaon 2. Again the correlation coefficients were compared, nd again Equation 1 consistently gave a "better fit" to ie observed infiltration values.

Values of the two constants, S/2 and A, were also etermined. Their physical significance was not fully ivestigated. However, if Equation 1 is considered adeuate and if sorptivity (S) is a physically meaningful arameter, a knowledge of S at various antecedent oisture contents would permit the prediction of inltration and runoff events from soil-moisture measureents.

The fourth report on Objective Three was a paper y Edwards and Larson (*9*) on their study of the inuence of the development of surface seal of soils on ıfiltration. They modified the Hanks and Bowers nuierical solution of the equation for infiltration of water ito a two-layered soil system, developing a solution or a one-layered soil system and using measured charcteristics from six Ida silt loam samples in the solution f the equation. They found that the estimated two-hour ıfiltration was reduced by as much as 50 percent by ırface sealing.

## Empirical Studies

A number of comparisons were made between physiıl or water-related properties of the soils and equilibum infiltration rates to see whether a positive correlaon existed. Comparisons of the following properties ith equilibrium infiltration rates showed no positive rrelations:

Percent clay in the surface layer

Maximum percent clay in a horizon layer in the soil

Bulk density in the surface layer (corn seedbed and rn after cultivation)

Maximum bulk density in a horizon in the soil (corn seedbed and corn after cultivation)

Moisture content at 0.1 bar (grass)

Difference in moisture content at 0.1 to 0.33 bar (grass and corn after cultivation)

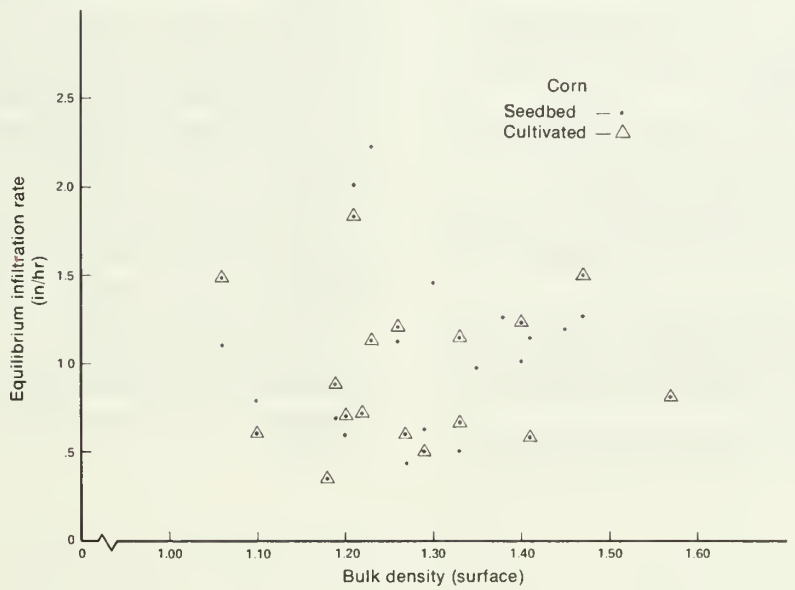
Difference in moisture content at 0.33 to 15 bars (grass and corn after cultivation)

In all cases the data points were so widely scattered that it was concluded that the calculation of a regression line would be meaningless, and none was made. Figure 6, a plot of surface bulk density versus equilibrium infiltration rate on the two corn treatments, is typical of plots of all eleven comparisons listed above.

Investigators at Alaska made multiple correlations on their data and found that the equilibrium rates correlated best with the soil-moisture level and the bulk density of the surface layer. The r values they obtained were about 0.7.

North Dakota workers, in trying to determine physical properties that correlated with the equilibrium infiltration rates of individual plots, found that the stability index — the mean weight-diameter of water-stable aggregates — gave the best results (*10*). Evidently this index (which was not determined in the standard tests) is an indicator of the ability of the soil surface to resist sealing or plugging; hence, it is a measure of the soil's ability to maintain infiltration.

Although the NC-40 projects have been terminated, scientists in the North Central Region and other regions of the United States have continued to work, particularly in the laboratory, to find physical parameters that can be used to characterize infiltration. This bulletin is not intended to review the literature from 1960 to date but to provide an historical record of the contributions of the NC-40 project to the current state of knowledge.




Bulk density versus equilibrium infiltration rates for the corn treatment plots, showing typical scatter of points in single-property comparisons. (Fig. 6)

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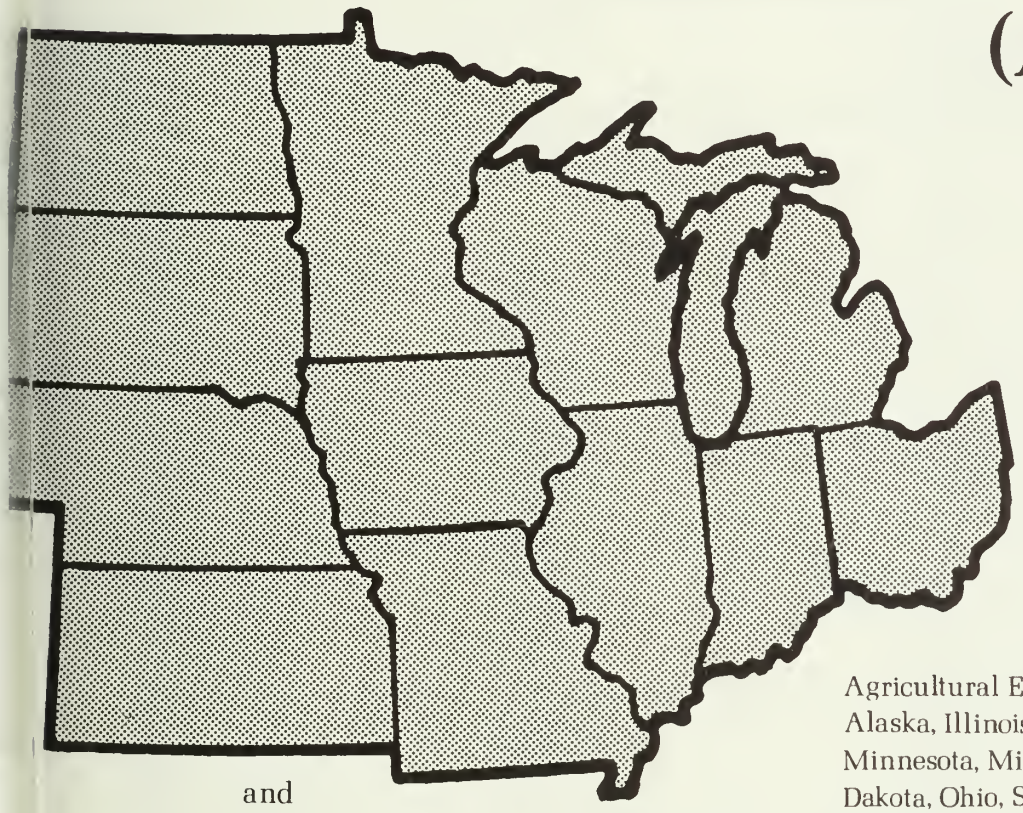
# Water Infiltration

## Into Representative Soils of the North Central Region (Appendixes)



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# *APPENDIX A. MOISTURE INFILTRATION RATE DATA*

Rates given are the mean rates over a period of time. The times listed are the midpoint times (in minutes) of the intervals for which the rates are given. When times are given in parentheses, they are midpoints of less uniform time intervals but also starting from the point of initial runoff; infiltration rates following the parentheses are the average rates over the stated intervals.

When an initial infiltration rate is listed (rate at 0 minutes), it is the calibrated rainfall rate for the first 5-minute interval and does not necessarily equal the average rainfall intensity for the entire run.

Rep. = replicate number.
Dup. = subplot with replicate.

The following lists give the soils tested and the states where tested, according to crop cover conditions.

**Corn seedbed:**

Bearden silty clay loam .....North Dakota
Blount silty clay loam .....Ohio
Bodenburg silt loam.....Alaska
Canfield silt loam .....Ohio
Cincinnati silt loam .....Indiana
Cisne silt loam .....Illinois
Clermont silt loam .....Indiana
Elliott silt loam.....Illinois
Emmet loamy sand.....Michigan
Fayette silt loam.....Wisconsin
Flanagan silt loam.....Illinois
Grundy silt loam.....Iowa
Holdrege silt loam .....Nebraska
Hoytville clay .....Ohio
Ida silt loam.....Iowa
Keith very fine sandy loam....Nebraska
Knik silt loam.....Alaska
Miami sandy loam .....Michigan
Minto silt loam .....Alaska
Moody silt loam .....Iowa
Morton loam .....North Dakota
Plainfield silty loam.....Wisconsin
Russell silt loam .....Indiana
Sharpsburg silty clay loam....Nebraska
Sims loam .....Michigan
Webster clay loam .....Minnesota
Withee silt loam.....Wisconsin

**Clipped bromegrass:**

Bearden silty clay loam.....North Dakota
Blount silty clay loam .....Ohio
Bodenburg silt loam .....Alaska
Canfield silt loam .....Ohio
Cincinnati silt loam .....Indiana
Cisne silt loam .....Illinois
Clermont silt loam .....Indiana
Dudley clay loam .....South Dakota
Elliott silt loam.....Illinois
Emmet loamy sand .....Michigan
Fayette silt loam .....Wisconsin
Flanagan silt loam.....Illinois
Grundy silt loam .....Iowa
Holdrege silt loam.....Nebraska
Hoytville clay .....Ohio
Ida silt loam .....Iowa
Keith very fine sandy loam....Nebraska
Kenyon silt loam .....Minnesota
Knik silt loam.....Alaska
Kranzburg silty clay loam ....South Dakota
Miami sandy loam .....Michigan
Minto silt loam.....Alaska
Moody silt loam .....Iowa
Morton loam .....North Dakota
Plainfield loamy sand .....Wisconsin
Port Byron silt loam .....Minnesota
Russell silt loam .....Indiana
Sharpsburg silty clay loam....Nebraska
Sims loam .....Michigan
Sinai silty clay loam .....South Dakota
Webster clay loam .....Minnesota
Withee silt loam.....Wisconsin

**Corn after cultivation:**

Blount silty clay loam .....Ohio
Canfield silt loam .....Ohio
Cincinnati silt loam .....Indiana
Cisne silt loam .....Illinois
Clermont silt loam .....Indiana
Dudley clay loam .....South Dakota
Elliott silt loam.....Illinois
Emmet loamy sand .....Michigan
Flanagan silt loam.....Illinois
Hoytville clay .....Ohio
Kenyon silt loam .....Minnesota
Kranzburg silty clay loam ....South Dakota
Miami sandy loam .....Michigan
Morton loam .....North Dakota
Port Byron silt loam .....Minnesota
Russell silt loam .....Indiana
Sims loam .....Michigan
Sinai silty clay loam .....South Dakota

*Appendix Table 1. Moisture Infiltration Rates on Soils With Corn Seedbed Treatment*

Soil: **Bearden silty clay loam (North Dakota)** Crop stage: Corn, 10 to 12 inches high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 32.5 min. | 37.5 min. | 42.5 min. | 47.5 min. | 52.5 min. | 57.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1965) | | | | | | | | | | | | | | | | | |
| 1 | | 33.4 | 4.7 | 6 | 4.7 | 1.2 | .6 | .4 | .3 | .3 | .3 | .3 | .3 | | | | .3 |
| 2 | | 32.3 | 4.9 | 5 | 4.9 | 2.6 | 1.3 | 1.0 | .8 | .7 | .6 | .6 | .6 | .6 | .6 | | .6 |
| 3 | | 32.2 | 4.7 | 6 | 4.7 | 2.8 | 1.7 | 1.2 | .8 | .6 | .4 | .3 | .2 | .2 | .2 | .2 | .2 |
| Wet run (June-July, 1965) | | | | | | | | | | | | | | | | | |
| 1 | | 35.4 | 4.9 | 4 | 4.9 | .8 | .5 | .3 | .3 | .3 | .3 | | | | | | .3 |
| 2 | | 35.9 | 4.8 | 3 | 4.8 | 1.4 | .4 | .3 | .2 | .2 | .1 | .1 | | | | | .1 |
| 3 | | 35.6 | 4.7 | 3 | 4.7 | 1.0 | .4 | .2 | .2 | .2 | .2 | | | | | | .2 |

Soil: **Blount silty clay loam (Ohio)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June-July, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.2 | 4.3 | 11.0 | 4.3 | 4.3 | 4.3 | (13.0)3.7 | 3.3 | 2.6 | .8 | .9 | .6 | .5 | .3 | .7 | .1 | .2 |
| 1 | 2 | 30.3 | 4.5 | 15.5 | 4.4 | 4.4 | 4.4 | 4.4 | (17.8)3.6 | 2.5 | 1.7 | .6 | .5 | .5 | .4 | .4 | .1 | .2 |
| 2 | 1 | 17.6 | 4.1 | 14.0 | 4.0 | 4.0 | 4.0 | (14.5)3.5 | 1.0 | 1.3 | .6 | .7 | .6 | .4 | .7 | .5 | .1 | .2 |
| 2 | 2 | 23.6 | 3.6 | 11.5 | 3.6 | 3.6 | 3.6 | (13.3)2.8 | 3.3 | 1.6 | 1.5 | .7 | .4 | .4 | .7 | .5 | .9 | .4 |
| 3 | 1 | 20.4 | 4.9 | 5.0 | 5.0 | 5.0 | 1.0 | .9 | .8 | | .7 | .6 | | .3 | .1 | .3 | .4 | .2 |
| 3 | 2 | 19.3 | 4.2 | 5.8 | 4.3 | 4.3 | (7.9)3.2 | 2.5 | 2.1 | 1.6 | 1.3 | 1.1 | 1.1 | .7 | .8 | .6 | .8 | .6 |
| Wet run (June-July, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 37.4 | 4.6 | 2.0 | 4.7 | | .6 | .7 | .5 | .2 | | .2 | .2 | .5 | .2 | .3 | .5 | .2 |
| 1 | 2 | 40.3 | 3.9 | 2.8 | 3.9 | (3.9)2.8 | 1.0 | .6 | .7 | .1 | .3 | .3 | .1 | .2 | .1 | .2 | .3 | .1 |
| 2 | 1 | 40.2 | 4.6 | 1.0 | 4.7 | (3.0)1.0 | .6 | .9 | .7 | .6 | .6 | .6 | .5 | .6 | .7 | .6 | .7 | .6 |
| 2 | 2 | 35.6 | 4.2 | 3.5 | 4.5 | | | | .6 | 1.7 | .1 | .5 | .9 | .2 | .2 | .2 | .6 | .2 |
| 3 | 1 | 29.2 | 4.6 | 1.8 | 4.6 | | | | | .9 | .7 | .7 | .5 | .7 | .6 | .5 | .6 | .4 |
| 3 | 2 | 39.8 | 3.7 | 1.0 | 4.0 | (3.0)2.3 | 1.9 | 1.0 | .2 | .5 | .8 | 1.0 | 1.1 | .7 | .3 | .7 | .9 | .5 |

*Appendix Table 1 (continued).*

Soil: **Bodenburg silt loam (Alaska)** Crop stage: No crop (second-year fallow following cultivation)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (1964) | | | | | | | | | | | | | | |
| 1 | 1 | 35.2 | 4.0 | 2.5 | 2.6 | 1.9 | 1.2 | .7 | .5 | .4 | .4 | .4 | .4 | .4 |
| 1 | 2 | 35.2 | 3.9 | 3.0 | | 2.1 | 1.3 | .8 | .5 | .5 | | | | .5 |
| 2 | 1 | 33.2 | 4.3 | 2.5 | 1.8 | .6 | .6 | .6 | .6 | .6 | | | | .6 |
| 2 | 2 | 31.1 | 4.2 | 3.0 | 2.9 | 2.2 | 1.4 | 1.1 | .6 | .6 | .6 | .6 | | .6 |
| 3 | 1 | 27.4 | 3.9 | 3.2 | | 2.6 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | | 1.1 |
| 3 | 2 | 28.3 | 4.1 | 3.0 | 3.0 | 2.3 | 1.6 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | | 1.2 |
| Wet run (1964) | | | | | | | | | | | | | | |
| 1 | 1 | 52.2 | 4.0 | 1.8 | 2.4 | .4 | .4 | .4 | .4 | .4 | | | | .4 |
| 1 | 2 | 53.6 | 4.3 | 2.2 | .7 | .7 | .7 | .7 | | | | | | .7 |
| 2 | 1 | 54.5 | 4.1 | 1.5 | 1.3 | .5 | .5 | .5 | .5 | .5 | | | | .5 |
| 2 | 2 | 50.6 | 4.2 | 2.0 | | 1.1 | .6 | .6 | .6 | .6 | | | | .6 |
| 3 | 1 | 45.2 | 4.0 | 1.8 | | 2.2 | .4 | .4 | .4 | .4 | | | | .4 |
| 3 | 2 | 53.1 | 4.1 | 2.0 | | 1.0 | .5 | .5 | .5 | .5 | | | | .5 |

Soil: **Canfield silt loam (Ohio)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June-July, 1965) | | | | | | | | | | | | | | | | |
| 1 | 1 | 23.0 | 4.7 | 2.2 | 4.8 | (3.6)1.5 | 1.2 | .3 | .2 | .7 | | | | | | .1 |
| 1 | 2 | 25.0 | 4.7 | 1.5 | 4.7 | (3.3)3.0 | 2.3 | 1.6 | 1.6 | 1.0 | 1.3 | 1.6 | | | | .8 |
| 2 | 1 | 25.1 | 4.4 | 1.0 | 4.6 | (3.0)3.6 | 1.7 | 1.3 | 1.5 | 1.0 | 1.0 | .9 | .6 | .7 | | .5 |
| 2 | 2 | 24.5 | 4.2 | 1.8 | 4.0 | (3.4)2.1 | 1.0 | .1 | .2 | .0 | .3 | .4 | | .2 | | .1 |
| 3 | 1 | 22.5 | 4.3 | 3.8 | 4.2 | (4.4)2.6 | 2.0 | 2.0 | 1.0 | .9 | .6 | | | | | .3 |
| 3 | 2 | 21.6 | 13.9 | 2.5 | 3.9 | (3.7)3.2 | 1.7 | 1.7 | 1.2 | 1.1 | 1.1 | 1.5 | 1.4 | 1.4 | | .9 |
| Wet run (June-July, 1965) | | | | | | | | | | | | | | | | |
| 1 | 1 | 27.3 | 4.6 | .8 | 4.7 | (2.9)2.1 | .8 | 1.0 | 1.0 | .3 | .8 | | | | | .3 |
| 1 | 2 | 25.9 | 4.1 | 2.0 | 4.4 | (3.5)1.0 | .9 | 1.0 | .7 | .4 | .9 | .8 | | | | .3 |
| 2 | 1 | 28.4 | 4.2 | 1.5 | 4.2 | (3.3)1.1 | 1.4 | .8 | 1.2 | .7 | 1.0 | 1.2 | .8 | .3 | | .4 |
| 2 | 2 | 27.7 | 4.2 | 1.2 | 4.5 | (3.1)1.7 | .4 | .4 | | .3 | .3 | .3 | .2 | | | .1 |
| 3 | 1 | 28.2 | 4.2 | 1.1 | 4.3 | (3.1)2.3 | 1.1 | .5 | | .4 | 1.0 | .2 | .5 | .8 | | .3 |
| 3 | 2 | 30.7 | 4.0 | 3.0 | 3.9 | (4.0)2.0 | 1.5 | 1.7 | 1.5 | .9 | 1.2 | 1.6 | 1.6 | 1.1 | 1.2 | 1.0 |

*Appendix Table 1 (continued).*

Soil: **Cincinnati silt loam (Indiana)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 21.0 | 4.7 | 9.5 | 4.7 | 4.7 | 4.2 | 3.3 | 2.8 | 2.3 | 1.9 | 1.6 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 |
| 1 | 2 | 21.5 | 4.7 | 10.0 | 4.7 | 4.7 | 4.4 | 3.2 | 2.7 | 2.2 | 1.7 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| 2 | 1 | 18.5 | 5.2 | 6.0 | 5.2 | 5.2 | 3.0 | 2.4 | 2.1 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| 2 | 2 | 21.2 | 4.6 | 9.0 | 4.6 | 4.6 | 3.9 | 3.0 | 2.2 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| 3 | 1 | 19.4 | 4.3 | 7.5 | 4.3 | 4.3 | 3.1 | 2.1 | 1.9 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 |
| 3 | 2 | 23.4 | 4.4 | 8.0 | 4.4 | 4.4 | 3.3 | 2.4 | 2.0 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 |
| Wet run (June, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.0 | 4.6 | 2.0 | 4.6 | 1.8 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 1 | 2 | 27.7 | 4.6 | 2.0 | 4.6 | 1.7 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 2 | 1 | 32.6 | 4.6 | 1.0 | 3.8 | 2.0 | 1.4 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 2 | 2 | 31.3 | 4.6 | 1.5 | 4.6 | 1.6 | .9 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 |
| 3 | 1 | 32.4 | 4.8 | 1.0 | 3.8 | 1.8 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| 3 | 2 | 40.0 | 4.8 | 1.0 | 3.6 | 1.8 | 1.6 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |

Soil: **Cisne silt loam (Illinois)**[a] Crop stage: No crop

| Identification Rep. | Dup. | Percent antededent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr, 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1963) | | | | | | | | | | | | | | | | |
| 1 | 1 | 15.7 | 3.9 | 12 | 2.5 | 2.2 | 1.5 | 1.6 | 1.5 | 1.3 | 1.1 | .7 | .4 | | | .4 |
| 1 | 2 | 18.5 | 4.2 | 8 | 1.4 | 1.3 | 1.1 | 1.2 | 1.3 | 1.2 | 1.2 | 1.2 | 1.0 | 1.1 | | 1.2 |
| 2 | 1 | 15.4 | 4.1 | 14 | 2.5 | 1.9 | 1.5 | 1.3 | 1.1 | 1.3 | 1.2 | 1.1 | 1.0 | 1.0 | .9 | .9 |
| 2 | 2 | 18.8 | 4.2 | 8 | 2.6 | 2.4 | 2.5 | 2.3 | 2.2 | 2.3 | 2.3 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 |
| 3 | 1 | 16.4 | 4.8 | 12 | 3.1 | 2.9 | 1.6 | 1.6 | 1.4 | 1.2 | 1.2 | 1.1 | 1.0 | .9 | .9 | .9 |
| 3 | 2 | 16.2 | 4.2 | 10 | 2.2 | 2.2 | .9 | .5 | .7 | .8 | .9 | .9 | 1.1 | | | 1.1 |
| Wet run (June, 1963) | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.3 | 4.2 | 4 | 1.7 | 1.1 | .6 | .5 | .6 | .4 | .4 | .3 | | | | .4 |
| 1 | 2 | 22.7 | 3.8 | 5 | 1.3 | 1.0 | .9 | .6 | .4 | .4 | .4 | .5 | .5 | | | .4 |
| 2 | 1 | 23.6 | 4.1 | 6 | 1.5 | 1.0 | .9 | 1.2 | equipment failure | | | | | | | .5[b] |
| 2 | 2 | 23.6 | 4.2 | 5 | 2.2 | 2.5 | 2.7 | 2.6 | 2.3 | 1.6 | 1.0 | .7 | .5 | | | .5 |
| 3 | 1 | 24.6 | 4.5 | 3 | 2.1 | 1.3 | 1.0 | 1.1 | .9 | .8 | .7 | .7 | | | | .7 |
| 3 | 2 | 21.0 | 5.0 | 8 | 2.3 | 1.7 | 1.4 | 1.4 | .8 | 1.0 | 1.1 | 1.1 | | | | 1.1 |

[a]Data pooled from Brownstown and Toledo experiment fields because of weather and equipment problems. Dup 1's are Brownstown, Dup 2's are Toledo.
[b]Calculated missing value.

*Appendix Table 1 (continued).*

Soil: **Clermont silt loam (Indiana)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | |
| 1 | 1 | 22.2 | 5.2 | 6.0 | 5.2 | 5.2 | 1.8 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1 | 2 | 22.2 | 4.8 | 5.0 | 5.2 | 3.8 | 1.7 | 1.4 | 1.1 | .8 | .7 | .7 | .7 | .7 |
| 2 | 1 | 19.0 | 5.2 | 6.0 | 5.2 | 5.2 | 1.4 | .8 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 2 | 19.0 | 4.6 | 5.0 | 4.6 | 2.8 | 1.2 | .6 | .5 | .4 | .4 | .4 | .4 | .4 |
| 3 | 1 | 20.4 | 4.8 | 5.0 | 4.8 | 3.8 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| 3 | 2 | 19.9 | 4.8 | 5.0 | 4.8 | 4.2 | 1.8 | 1.3 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Wet run (June, 1961) | | | | | | | | | | | | | | |
| 1 | 1 | 24.0 | 5.0 | 2.0 | 5.0 | 2.2 | 1.0 | .8 | .8 | .8 | .8 | .8 | | .8 |
| 1 | 2 | 25.2 | 5.0 | 1.0 | 4.7 | 2.5 | .9 | .9 | .9 | .9 | .9 | .9 | | .9 |
| 2 | 1 | 23.8 | 5.2 | 3.0 | 5.2 | 1.3 | .6 | .3 | .1 | .0 | .0 | .0 | .0 | .1 |
| 2 | 2 | 24.1 | 5.2 | 2.0 | 5.2 | 1.3 | .6 | .3 | .1 | .0 | .0 | .0 | .0 | .1 |
| 3 | 1 | 25.1 | 4.6 | 1.0 | 4.2 | 2.6 | 1.9 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 3 | 2 | 24.6 | 4.6 | 1.5 | 4.6 | 2.8 | 1.4 | .6 | .4 | .4 | .4 | .4 | .4 | .4 |

Soil: **Elliott silt loam (Illinois)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 20.7 | 4.8 | 39 | 3.8 | 3.7 | 3.1 | 3.4 | 2.8 | 3.0[a] | 3.2[a] | 3.3[a] | 3.4[a] | 3.4[a] | 2.7[a] | 3.3[a] | |
| 1 | 2 | 21.3 | 4.4 | 44 | 3.4 | 3.2 | 2.9 | 2.8 | 2.6 | 2.4 | 2.4 | 2.4 | 2.4 | 2.5 | 2.4 | 2.4 | 2.4 |
| 2 | 1 | 18.7 | 4.4 | 4 | 4.3 | 4.2 | 4.1 | 3.9 | 3.4 | 3.1 | 2.9 | 2.7 | 2.6 | 2.5 | 2.5 | 2.5 | 2.4 |
| 2 | 2 | 15.7 | 4.6 | 1 | 4.6 | 4.5 | 4.4 | 4.3 | 4.2 | 4.0 | 3.9 | 3.7 | 3.6 | 3.4 | 3.3 | 3.1 | 3.0 |
| 3 | 1 | 17.8 | 3.9 | 30 | 3.7 | 3.7 | 3.6 | 3.6 | 3.6 | 3.3 | 3.0 | 2.8 | 2.7 | 2.5 | 2.2 | 2.0 | 1.9 |
| 3 | 2[b] | | | | | | | | | | | | | | | | |
| Wet run (June, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 34.8 | 4.7 | 0 | 2.3 | 2.2 | 1.8 | 1.6 | 1.4 | 1.2 | 1.0 | 1.0 | 1.0 | 1.0 | 1.1 | | 1.0 |
| 1 | 2 | 28.2 | 4.2 | 4 | 3.4 | 2.8 | 2.1 | 1.5 | 1.5 | 1.6 | 1.6 | 1.9 | 1.8 | 1.8 | 1.7 | 1.3 | 1.6 |
| 2 | 1 | 27.9 | 4.3 | 0 | 2.5 | 2.3 | 2.2 | 2.0 | 1.9 | 1.9 | 1.8 | 1.6 | 1.4 | 1.4 | 1.3 | .8 | 1.2 |
| 2 | 2[b] | 28.7 | 4.4 | 1 | 3.4 | 2.9 | 2.4 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.2 | 2.3 | 2.1 |
| 3 | 1[b] | | | | | | | | | | | | | | | | |
| 3 | 2[b] | | | | | | | | | | | | | | | | |

[a]Mechanical failure.
[b]Excessive rain forced cancellation of run.

*Appendix Table 1 (continued).*

Soil: **Emmet loamy sand (Michigan)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 6.1 | 5.5 | 3.0 | 4.0 | 3.0 | 3.0 | 3.2 | 2.9 | 2.8 | 2.5 | 2.8 | 2.8 | | | | | 2.8 |
| 1 | 2 | 7.3 | 4.2 | 6.0 | 3.9 | 1.5 | 1.7 | 1.6 | 2.1 | 1.7 | 1.5 | 1.6 | 1.5 | 1.5 | 1.5 | | | 1.5 |
| 2 | 1 | 6.2 | 5.1 | ? | ? | ? | ? | ? | ? | 2.4 | 2.6 | 2.9 | 3.0 | 2.8 | 2.6 | 2.7 | 2.7 | 2.7 |
| 2 | 2 | 6.1 | 5.1 | 3.5 | 4.8 | 4.4 | 3.6 | 2.8 | 3.3 | 3.0 | 3.1 | 2.8 | 2.5 | 2.5 | 2.4 | 2.7 | | 2.5 |
| 3 | 1 | 5.7 | 4.9 | 38.0 | 2.0 | 2.1 | 2.4 | 2.6 | 2.8 | 2.6 | 2.3 | | | | | | | 2.3 |
| 3 | 2 | 6.7 | 4.7 | 5.0 | 3.4 | 3.5 | 3.6 | 2.9 | 2.8 | 2.4 | 2.6 | 2.4 | 2.0 | 1.9 | | | | 1.9 |
| Wet run (June, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 9.8 | 5.2 | 1.5 | 3.3 | 2.9 | 3.2 | 3.4 | 3.7 | 3.8 | 3.6 | 3.5 | 3.7 | 3.4 | 3.4 | 3.7 | | 3.5 |
| 1 | 2 | 10.1 | 4.2 | 2.0 | 1.0 | .3 | .3 | .6 | .3 | .3 | | | | | | | | .3 |
| 2 | 1 | 20.6 | 5.6 | 2.0 | 4.2 | 3.8 | 3.8 | 3.7 | 3.6 | 3.3 | 2.2 | 2.1 | 2.4 | | | | | 2.2 |
| 2 | 2 | 11.4 | 5.1 | 2.0 | 4.2 | 3.8 | 2.8 | 2.0 | 1.8 | 1.7 | 1.3 | 1.0 | 1.0 | | | | | 1.0 |
| 3 | 1 | 11.4 | 4.8 | 1.5 | 2.1 | 1.7 | 1.4 | 1.4 | 1.4 | 1.4 | | | | | | | | 1.4 |
| 3 | 2 | 10.9 | 4.7 | 3.0 | .1 | .2 | .8 | .4 | .6 | | | | | | | | | .6 |

Soil: **Fayette silt loam (Wisconsin)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 15 min. | 30 min. | 45 min. | 60 min. | 75 min. | 90 min. | 105 min. | 120 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1965) | | | | | | | | | | | | | |
| 1 | 1 | 13.4 | 3.9 | 12 | 3.9 | 3.6 | 2.6 | 2.1 | 1.4 | 1.1 | 1.0 | .8 | .8 |
| 1 | 2 | | 3.9 | 3 | 3.9 | 3.1 | 2.1 | 1.4 | .9 | 1.1 | .9 | .2 | .5 |
| 2 | 1 | | 4.1 | 15 | 4.1 | 2.5 | 1.3 | 1.3 | .5 | .1 | .8 | .7 | .7 |
| 2 | 2 | | 4.1 | 5 | 4.1 | 3.9 | 3.1 | 2.4 | 1.8 | 1.5 | 1.7 | 1.6 | 1.6 |
| Wet run (July, 1965) | | | | | | | | | | | | | |
| 1 | 1 | 16.2 | 3.8 | 7 | .9 | .6 | .4 | .1 | .0 | .0 | .0 | | .1 |
| 1 | 2 | | 4.1 | 2 | 1.7 | .9 | .3 | .5 | .6 | .4 | .6 | .9 | .8 |
| 2 | 1 | | 3.8 | 2 | 2.2 | .4 | .1 | .0 | .0 | .0 | .0 | | .0 |
| 2 | 2 | | 3.8 | 2 | 2.1 | .5 | .4 | .4 | | .2 | | .2 | .2 |

*Appendix Table 1 (continued).*

Soil: **Flanagan silt loam (Illinois)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 21.1 | 4.9 | 48 | 4.2 | 3.9 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 | 3.6 | 3.5 |
| 1 | 2 | 23.2 | 5.0 | 23 | 4.5 | 4.2 | 4.1 | 4.0 | 4.0 | 4.0 | 4.1 | 4.1 | 4.2 | 4.1 | 4.0 | 3.5 | 3.8 |
| 2 | 1 | 20.8 | 4.5 | 11 | 4.4 | 4.1 | 4.0 | 3.8 | 3.6 | 3.4 | 3.3 | 3.1 | 2.9 | 2.7 | 2.7 | 2.5 | 2.7 |
| 2 | 2 | 26.7 | 3.5 | 63 | 3.1 | 3.0 | 2.8 | 2.9 | 2.9 | 2.9 | 2.8 | 2.8 | 2.7 | 2.7 | 2.8 | 2.9 | 2.8 |
| 3 | 1 | 22.4 | 4.9 | 18 | 4.4 | 4.2 | 3.7 | 3.5 | 3.5 | 3.3 | 3.0 | 2.5 | 2.5 | 2.5 | 2.4 | | 2.4 |
| 3 | 2 | 20.1 | 4.6 | 19 | 4.1 | 4.0 | 3.8 | 3.7 | 3.6 | 3.6 | 3.6 | 3.5 | 3.5 | 3.4 | 3.3 | 3.2 | 3.0 |
| Wet run (June, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 31.2 | 4.4 | 15 | 2.8 | 2.7 | 2.7 | 3.2 | 3.2 | 3.4 | 3.4 | 3.2 | 2.6 | 2.1 | 2.2 | 2.3 | 2.1 |
| 1 | 2 | | 4.4 | 6 | 2.4 | 1.8 | 1.0 | 1.0 | .9 | .9 | .9 | .8 | .8 | | | | .8 |
| 2 | 1 | 20.8 | 4.5 | 11 | 3.3 | 2.0 | 1.2 | 1.4 | 1.4 | 1.3 | 1.3 | 1.5 | 1.5 | 1.5 | | | 1.5 |
| 2 | 2 | 30.9 | 4.6 | 6 | 3.6 | 3.4 | 2.7 | 2.7 | 2.8 | 2.8 | 2.8 | 2.7 | 2.6 | 2.6 | 2.4 | 1.9 | 2.4 |
| 3 | 1 | 26.7 | 4.8 | 3 | 2.2 | 2.2 | 1.8 | 1.6 | 1.6 | 1.5 | 1.3 | 1.1 | 1.0 | .9 | | | .7 |
| 3 | 2 | 26.3 | 4.7 | 6 | 4.0 | 4.0 | 4.0 | 4.1 | 4.1 | 4.1 | 4.2 | 4.2 | 4.3 | 4.1 | 3.8 | 3.5 | 3.5 |

Soil: **Grundy silt loam (Iowa)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 37.5 | 4.5 | 11.0 | 4.5 | 4.5 | 4.4 | 3.8 | 3.7 | 3.5 | 3.5 | 3.8 | 3.4 | 3.7 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 |
| 1 | 2 | 25.8 | 3.9 | 13.5 | 3.9 | 3.9 | 3.9 | 3.4 | 2.9 | 2.5 | 2.1 | 1.6 | 2.1 | 1.7 | 2.3 | 2.0 | 1.8 | 2.0 | 2.0 |
| 2 | 1 | 22.0 | 4.5 | 10.0 | 4.5 | 4.5 | 4.4 | 4.4 | 4.4 | 4.4 | 4.1 | 3.8 | 3.8 | 4.6 | 3.4 | 2.7 | 2.7 | 2.7 | 2.7 |
| 2 | 2 | 34.0 | 4.4 | 18.0 | 4.4 | 4.4 | 4.4 | 4.4 | 4.3 | 2.8 | 1.8 | 1.4 | 1.3 | 1.0 | 1.4 | 1.0 | 1.2 | | 1.2 |
| 3 | 1 | 32.2 | 4.5 | 8.0 | 4.5 | 4.5 | 4.2 | 4.2 | 3.7 | 2.3 | 1.0 | 1.5 | 1.4 | 1.4 | 1.4 | 1.0 | 1.2 | 1.1 | 1.1 |
| 3 | 2 | 31.9 | 4.3 | 13.0 | 4.3 | 4.3 | 4.3 | 4.2 | 4.2 | 3.9 | 3.3 | 3.2 | 2.0 | 1.8 | 1.7 | 1.3 | 1.4 | 1.3 | 1.3 |
| Wet run (July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 36.2 | 4.3 | 3.0 | 4.3 | 2.0 | 2.2 | 2.4 | 2.7 | 2.5 | 2.2 | 2.4 | 2.7 | 2.7 | 2.5 | 2.8 | | | 2.7 |
| 1 | 2 | 42.6 | 4.4 | 5.0 | 4.4 | 3.2 | 2.1 | 1.9 | 1.9 | 1.7 | 1.7 | 1.7 | 1.2 | .9 | 1.9 | .9 | | | 1.2 |
| 2 | 1 | 42.2 | 4.0 | 3.0 | 4.0 | 2.6 | 1.7 | 1.1 | 1.3 | 1.3 | .9 | 1.3 | 1.1 | .9 | 1.3 | 1.0 | | | .9 |
| 2 | 2 | 41.4 | 4.5 | 5.5 | 4.5 | 3.7 | 2.0 | 1.5 | 1.5 | 1.0 | 1.2 | 1.8 | .4 | | | | | | .5 |
| 3 | 1 | 36.8 | 4.4 | 3.0 | 4.4 | 2.8 | 1.4 | 2.1 | 1.5 | 1.0 | 1.3 | 1.7 | 1.0 | 1.3 | 1.7 | | | | 1.2 |
| 3 | 2 | 43.5 | 4.4 | 8.0 | 4.4 | 4.4 | 2.5 | 1.5 | 1.3 | .7 | .9 | 1.5 | .6 | .3 | .6 | .9 | | | .4 |

[a]Wet-run equilibrium values calculated by applying field data to Phillip's (8) equation.

*Appendix Table 1 (continued).*

Soil: **Holdrege silt loam (Nebraska)** Crop stage: Corn, 2 to 6 inches high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 15 20 min. | 25 min. | 35 min. | 45 min. | 55 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July-August, 1964) | | | | | | | | | | | |
| 1 | 1 | 26.3 | 4.6 | 10 | | 2.4 | 1.6 | 1.2 | 1.3 | 1.2 | 1.2 |
| 2 | 1 | 6.0 | 4.8 | 32 | | | | 3.6 | 3.0 | 2.4 | 2.4 |
| 3 | 1 | 4.9 | 4.1 | 14 | | 3.8 | 3.4 | 2.6 | 2.4 | 2.2 | 2.2 |
| Wet run (July-August, 1964) | | | | | | | | | | | |
| 1 | 1 | FC | 4.2 | 3 | 3.3 | .9 | .5 | .8 | .7 | .7 | .7 |
| 2 | 1 | FC | 5.1 | 3 | 3.5 | 1.9 | 1.8 | 1.6 | 1.8 | 1.2 | 1.2 |
| 3 | 1 | FC | 5.2 | 7 | 4.3 | 2.1 | 2.0 | 1.8 | 1.9 | 1.7 | 1.7 |

FC= field capacity.

Soil: **Hoytville clay (Ohio)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | 95.0 min. | 105.0 min. | 115.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 17.5 | 4.6 | 9.5 | 4.5 | 4.5 | (9.8) 4.1 | 4.4 | 4.2 | 4.0 | 3.8 | 3.2 | 2.2 | 1.6 | 1.5 | 1.3 | 1.2 | | | | 1.3 |
| 1 | 2 | 19.1 | 4.0 | 6.8 | 4.1 | 4.1 | (8.4) 3.7 | 3.2 | 3.2 | 3.5 | 3.0 | 2.0 | 1.4 | .6 | .4 | .2 | | | | | .4 |
| 2 | 1 | 14.9 | 4.2 | 5.8 | 4.1 | 4.1 | (7.9) 4.0 | 4.1 | 4.0 | 3.9 | 3.8 | 3.7 | 3.9 | 3.7 | | 3.1 | 2.7 | 2.0 | 2.1 | 2.3 | 2.7 |
| 2 | 2 | 11.5 | 4.4 | 14.5 | 4.2 | 4.2 | 4.2 (14.8) | 4.1 | 4.0 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.7 | 3.6 | 3.8 | 3.1 | 3.4 | 3.2 | 3.4 |
| 3 | 1 | 12.2 | 4.3 | 5.0 | 4.5 | 4.5 | (7.5) 4.4 | 4.3 | 4.3 | 4.1 | 4.0 | 4.1 | 3.9 | 3.6 | 4.0 | 4.0 | 4.0 | 3.7 | 3.6 | 3.4 | 3.7 |
| 3 | 2 | 8.4 | 4.3 | 14.0 | 4.3 | 4.3 | 4.3 (14.5) | 4.2 | 4.2 | 4.4 | 4.4 | 3.9 | 3.9 | 3.9 | 3.8 | 3.6 | 3.2 | 3.0 | 2.9 | 2.8 | 3.2 |
| Wet run (July, 1964) | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 44.3 | 4.8 | 2.0 | 4.9 | (3.5) 2.7 | 1.8 | 1.0 | .5 | .8 | 1.2 | .9 | 1.0 | 1.4 | | | | | | | .9 |
| 1 | 2 | 47.4 | 4.8 | 1.5 | 4.7 | (3.3) 3.7 | 1.3 | .5 | | .9 | | .8 | .3 | .7 | | | | | | | .3 |
| 2 | 1 | 37.4 | 4.5 | 2.0 | 4.3 | (3.5) 3.2 | 2.0 | 1.6 | 1.2 | 1.5 | .9 | 1.5 | 1.4 | 1.3 | | | | | | | .8 |
| 2 | 2 | 40.3 | 4.5 | 3.5 | 3.5 | | | | | 1.3 | 1.6 | 1.5 | .9 | | | | | | | | .7 |
| 3 | 1 | 42.2 | 4.4 | 3.0 | 4.4 | (4.0) 4.0 | 3.3 | 3.1 | 2.8 | 2.6 | 2.7 | 2.3 | 1.8 | 1.8 | | | | | | | 1.7 |
| 3 | 2 | 44.7 | 3.5 | 3.0 | 3.6 | (4.0) 2.6 | 2.5 | 2.0 | 2.4 | 2.4 | 2.3 | 2.2 | 2.3 | 2.0 | 1.8 | 1.9 | 1.7 | | | | 1.8 |

*Appendix Table 1 (continued).*

Soil: **Ida silt loam (Iowa)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate[a] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June-July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.5 | 4.5 | 8.0 | 4.5 | 4.5 | 3.8 | 2.4 | 2.0 | 1.9 | 1.4 | 1.5 | 1.5 | .8 | 1.2 | 1.8 | 1.5 | 1.4 | 1.3 |
| 1 | 2 | 25.5 | 4.4 | 10.0 | 4.4 | 4.4 | 4.0 | 2.8 | 2.3 | 2.3 | 1.8 | 2.1 | 1.5 | 1.8 | 1.7 | 1.8 | 1.7 | 1.9 | 1.7 |
| 2 | 1 | 23.9 | 4.1 | 13.0 | 4.1 | 4.1 | 4.1 | 3.6 | 2.5 | 2.0 | 1.8 | 1.6 | 1.6 | 1.5 | 1.5 | 1.9 | 1.5 | 1.2 | 1.5 |
| 2 | 2 | 22.2 | 4.3 | 14.5 | 4.3 | 4.3 | 4.3 | 3.9 | 3.2 | 2.9 | 2.7 | 2.5 | 2.4 | 2.1 | 2.5 | 2.7 | 2.2 | 2.4 | 2.4 |
| 3 | 1 | 15.8 | 4.1 | 14.0 | 4.1 | 4.1 | 4.1 | 3.6 | 2.9 | 2.5 | 2.2 | 2.2 | 2.3 | 2.0 | 2.0 | 2.3 | 2.2 | 2.2 | 2.2 |
| 3 | 2 | 18.6 | 4.4 | 12.0 | 4.4 | 4.4 | 4.3 | 2.8 | 2.1 | 1.8 | 1.8 | 1.4 | 1.4 | 1.3 | 1.8 | 1.7 | | | 1.4 |
| Wet run (June-July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 35.5 | 4.2 | 2.5 | 4.1 | 3.1 | .4 | .7 | .5 | .7 | .1 | .7 | .9 | .4 | .4 | .2 | .4 | | .2 |
| 1 | 2 | 33.3 | 4.4 | 4.0 | 4.4 | 2.6 | 1.0 | .6 | .6 | .6 | .6 | .6 | .9 | | | | | | .2 |
| 2 | 1 | 28.2 | 4.1 | 9.0 | 4.1 | 4.1 | 2.2 | 1.5 | 1.2 | 1.0 | 1.0 | .8 | .8 | .8 | 1.7 | .7 | .8 | | .7 |
| 2 | 2 | 27.4 | 4.2 | 5.5 | 4.2 | 3.8 | 2.6 | 2.0 | 2.1 | 2.0 | 2.0 | 1.7 | 2.0 | 2.0 | 1.9 | 1.9 | 1.7 | | 1.7 |
| 3 | 1 | 30.7 | 4.4 | 4.0 | 4.4 | 3.6 | 1.7 | 1.3 | 1.3 | 1.1 | 1.4 | 1.1 | 1.7 | 1.9 | 1.9 | | | | 1.2 |
| 3 | 2 | 34.6 | 4.1 | 5.0 | 4.1 | 3.1 | 1.4 | 1.1 | .4 | .8 | .7 | .4 | .3 | 1.2 | .8 | .4 | .4 | | .3 |

[a]Wet-run equilibrium values calculated by applying field data to Phillip's (8) equation.

Soil: **Keith very fine sandy loam (Nebraska)** Crop stage: No crop (tillage:black fallow)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 25 min. | 35 min. | 45 min. | 55 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1964) | | | | | | | | | | | |
| 1 | 1 | 10.8 | 4.8 | 12 | | 2.5 | 1.9 | 1.7 | 1.4 | 1.5 | 1.4 |
| 2 | 1 | 10.8 | 4.6 | 14 | | 2.5 | 1.8 | 1.6 | 1.7 | 1.3 | 1.3 |
| 3 | 1 | 12.7 | 4.6 | 14 | | 3.8 | 1.6 | 2.4 | 1.9 | | 1.9 |
| Wet run (August, 1964) | | | | | | | | | | | |
| 1 | 1 | FC | 4.7 | 2 | 1.5 | 1.0 | 1.0 | .7 | .4 | | .4 |
| 2 | 1 | FC | 4.8 | 2 | 2.2 | 1.3 | .8 | 1.8 | 1.4 | 1.2 | 1.2 |
| 3 | 1 | FC | 4.2 | 5 | 2.1 | .8 | .5 | .5 | .4 | .4 | .4 |

FC = field capacity.

*Appendix Table 1 (continued).*

Soil: **Knik silt loam (Alaska)** Crop stage: No crop (Second-year fallow following cultivation)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (1964) | | | | | | | | | | | | | | | |
| 1 | 1 | 32.5 | 4.0 | 4.5 | | 2.6 | 2.1 | 1.7 | 1.3 | .9 | .6 | .4 | .4 | .4 | .4 |
| 1 | 2 | 26.9 | 4.1 | 1.0 | 2.5 | 1.6 | 1.0 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 1 | 29.6 | 4.2 | 4.0 | 2.8 | 1.8 | 1.1 | .7 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 2 | 30.2 | 4.1 | 2.0 | 2.9 | 2.0 | 1.2 | .8 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 3 | 1 | 32.2 | 4.0 | 2.0 | 2.6 | 2.0 | 1.4 | .9 | .6 | .4 | .4 | .4 | .4 | .4 | .4 |
| 3 | 2 | 33.2 | 3.8 | 3.0 | | 2.0 | .8 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| Wet run (1964) | | | | | | | | | | | | | | | |
| 1 | 1 | 40.1 | 3.9 | 2.0 | 2.6 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | | | .3 |
| 1 | 2 | 45.2 | 4.1 | 1.0 | 1.8 | .8 | .4 | .2 | .2 | .2 | .2 | .2 | | | .2 |
| 2 | 1 | | | | | | | | | | | | | | .3[a] |
| 2 | 2 | 40.4 | 4.1 | 1.5 | 1.3 | .8 | .5 | .4 | .3 | .3 | .3 | .3 | | | .3 |
| 3 | 1 | 47.0 | 4.0 | 1.0 | 1.2 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | | | .4 |
| 3 | 2 | 45.4 | 4.1 | 1.5 | 1.7 | 1.0 | .7 | .6 | .6 | .6 | .6 | .6 | | | .6 |

[a]Missing value determined by method for missing plots.

Soil: **Miami sandy loam (Michigan)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (May 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 15.1 | 4.5 | 12.0 | 3.6 | 4.5 | 4.1 | 4.5 | 3.7 | 2.9 | 2.3 | 2.5 | 2.5 | 2.4 | 2.2 | 2.7 | 2.0 | 2.0 |
| 1 | 2 | 13.9 | 5.1 | 14.0 | 4.1 | 3.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 | 2.0 | 1.8 | | | | | 2.0 |
| 2 | 1 | 12.7 | 5.5 | 17.0 | 4.7 | 5.2 | 4.8 | 4.4 | 4.1 | 3.9 | 4.2 | 4.0 | 3.1 | 3.2 | 2.7 | 2.7 | 3.0 | 2.7 |
| 2 | 2 | 15.8 | 5.5 | 15.0 | 4.0 | 3.7 | 2.8 | 2.9 | 2.7 | 1.9 | 2.2 | | | | | | | 2.2 |
| 3 | 1 | 17.4 | 5.3 | 7.5 | 4.9 | 4.7 | 4.5 | 4.3 | 4.5 | 4.1 | 3.9 | 3.2 | 2.7 | 2.2 | 2.4 | 2.2 | | 2.3 |
| 3 | 2 | 17.3 | 5.2 | 15.0 | 4.3 | 4.6 | 4.5 | 4.3 | 4.4 | 4.3 | 3.7 | 3.7 | 3.7 | 3.1 | 3.3 | 3.1 | 3.8 | 3.7 |
| Wet run (May 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 17.9 | 4.9 | 4.0 | 4.8 | 4.2 | .9 | 1.4 | 1.4 | 1.6 | 1.2 | | | | | | | 1.4 |
| 1 | 2 | 18.9 | 5.3 | 3.0 | 2.8 | 2.0 | 2.1 | 2.0 | 1.8 | 1.9 | 1.7 | 1.7 | 1.5 | 1.5 | 1.5 | | | 1.5 |
| 2 | 1 | 16.4 | 4.7 | 5.0 | 2.2 | .1 | .4 | .6 | .1 | | | | | | | | | .3 |
| 2 | 2 | 21.4 | 5.7 | 4.0 | 3.8 | 2.5 | 2.5 | 2.5 | 2.9 | 2.5 | 2.2 | | | | | | | 2.5 |
| 3 | 1 | 23.6 | 4.9 | 11.0 | 3.8 | 2.1 | 1.4 | 1.0 | .8 | .7 | | | | | | | | .8 |
| 3 | 2 | 23.9 | 4.4 | 10.0 | 2.9 | 2.2 | 2.0 | 1.6 | 1.4 | 1.1 | .9 | .8 | | | | | | .9 |

*Appendix Table 1 (continued).*

Soil: **Minto silt loam (Alaska)** Crop stage: No crop (second-year fallow following cultivation)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (1964) | | | | | | | | | | | | | |
| 1 | 1 | 23.2 | 4.2 | 3.0 | 3.2 | 2.0 | 1.6 | .8 | .6 | .6 | .6 | .6 | .6 |
| 1 | 2 | 26.1 | 4.0 | 4.0 | 4.4 | 2.4 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 1 | 25.2 | 4.0 | 3.5 | | | 2.0 | .4 | .4 | .4 | | | .4 |
| 2 | 2 | 25.2 | 4.2 | 3.5 | | 3.2 | 2.4 | 1.5 | .6 | .6 | .6 | .6 | .6 |
| 3 | 1 | 23.8 | 4.1 | 2.5 | | 3.4 | .8 | .5 | .5 | .5 | .5 | | .5 |
| 3 | 2 | 26.6 | 4.1 | 2.5 | 3.2 | 2.4 | 1.5 | .6 | .5 | .5 | .5 | .5 | .5 |
| Wet run (1964) | | | | | | | | | | | | | |
| 1 | 1 | 29.7 | 4.1 | 1.5 | 1.6 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| 1 | 2 | 29.4 | 4.3 | 1.0 | 1.8 | .5 | .3 | .3 | .3 | .3 | | | .3 |
| 2 | 1 | 30.5 | 4.0 | 1.2 | 2.0 | .4 | .4 | .4 | .4 | .4 | | | .4 |
| 2 | 2 | 29.7 | 4.0 | 1.0 | 2.1 | 1.0 | .4 | .4 | .4 | .4 | | | .4 |
| 3 | 1 | 31.9 | 4.3 | 1.0 | 2.7 | 1.0 | .4 | .4 | .4 | .4 | | | .4 |
| 3 | 2 | 37.5 | 4.2 | 1.0 | 1.6 | .4 | .4 | .4 | .4 | .4 | | | .4 |

Soil: **Moody silt loam (Iowa)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate[a] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July-August, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 28.4 | 4.2 | 9.0 | 4.2 | 4.2 | 4.1 | 3.0 | 1.9 | 1.6 | 1.9 | 1.7 | 1.6 | 1.5 | 1.5 | 1.6 | | | 1.5 |
| 1 | 2 | 33.4 | 4.0 | 9.0 | 4.0 | 4.0 | 3.9 | 3.2 | 2.4 | 1.9 | 1.5 | 1.4 | 1.3 | 1.3 | 1.1 | 1.1 | 1.0 | 1.4 | 1.1 |
| 2 | 1 | 25.2 | 4.3 | 12.5 | 4.3 | 4.3 | 4.2 | 3.6 | 2.2 | 2.1 | 1.7 | 1.7 | 1.2 | 1.7 | 1.3 | 1.3 | 1.6 | 1.4 | 1.3 |
| 2 | 2 | 34.0 | 4.7 | 10.0 | 4.7 | 4.7 | 4.4 | 3.3 | 3.1 | 2.8 | 1.9 | 1.9 | 1.6 | 1.8 | 1.6 | 1.8 | | | 1.6 |
| 3 | 1 | 26.1 | 4.7 | 11.0 | 4.7 | 4.7 | 4.6 | 3.9 | 3.3 | 2.6 | 2.6 | 2.5 | 2.2 | 2.2 | 2.2 | 1.8 | | | 2.0 |
| 3 | 2 | 29.8 | 4.0 | 10.0 | 4.0 | 4.0 | 3.9 | 3.7 | 3.2 | 2.8 | 2.4 | 2.1 | 1.9 | 1.8 | 1.5 | 1.5 | 1.7 | | 1.6 |
| Wet run (July-August, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 34.4 | 4.5 | 5.5 | 4.5 | 3.7 | 1.2 | 1.0 | .7 | .7 | .7 | .5 | .1 | .7 | .4 | | | | .2 |
| 1 | 2 | 38.0 | 4.3 | 3.5 | 4.3 | 2.1 | .2 | .6 | .2 | .5 | .5 | .5 | .2 | .3 | .5 | .2 | .2 | | .1 |
| 2 | 1 | 38.9 | 4.1 | 3.0 | 4.1 | 1.4 | .3 | .6 | .4 | .1 | .4 | .4 | .3 | .6 | .3 | | | | .2 |
| 2 | 2 | 38.2 | 4.2 | 3.0 | 4.2 | .8 | .8 | .8 | .8 | 1.1 | .8 | .7 | .9 | .9 | | | | | .9 |
| 3 | 1 | 36.9 | 3.9 | 1.5 | 3.2 | .8 | .8 | .8 | .6 | .6 | .6 | .6 | .9 | .9 | | | | | .4 |
| 3 | 2 | 37.1 | 4.1 | 1.5 | 3.6 | 1.2 | .8 | .7 | .6 | .8 | .6 | .3 | 1.1 | .3 | .6 | | | | .3 |

[a]Wet-run equilibrium values calculated by applying field data to Philip's (8) equation.

*Appendix Table 1 (continued).*

Soil: **Morton loam (North Dakota)** Crop stage: Corn, 3 inches tall

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean, rate, in./hr. 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 32.5 min. | 37.5 min. | 47.5 min. | 57.5 min. | 67.5 min. | 77.5 min. | 87.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1962) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 24.4 | 4.5 | 7 | 4.5 | 4.3 | 3.0 | 2.3 | 1.8 | 1.6 | 1.3 | 1.0 | .8 | .6 | .6 | .6 | .6 | .6 |
| 1 | 2 | | 4.6 | 13 | 4.6 | 4.6 | 4.6 | 3.2 | 2.7 | 2.2 | 1.8 | 1.4 | 1.0 | .9 | .8 | .8 | .8 | .8 |
| 2 | 1 | | 4.6 | 1 | 4.1 | 2.9 | 2.1 | 1.6 | 1.5 | 1.3 | 1.2 | 1.2 | 1.0 | .9 | .8 | .8 | .7 | .8 |
| 2 | 2 | | 4.6 | 8 | 4.6 | 4.6 | 2.1 | .8 | .5 | .5 | .4 | 1.2 | 1.0 | .9 | .9 | .9 | | .9 |
| 3 | 1 | | 4.6 | 8 | 4.6 | 4.6 | 2.6 | 2.1 | 1.9 | 1.7 | 1.5 | 1.4 | 1.2 | 1.0 | .9 | .9 | .8 | .9 |
| 3 | 2 | | 4.8 | 1 | 2.7 | 1.4 | 1.1 | 1.0 | .9 | .8 | .7 | .7 | .6 | .5 | .5 | .5 | | .5 |
| Wet run (June, 1962) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 27.0 | 4.6 | 1 | 3.0 | .8 | .6 | .6 | .6 | .6 | .6 | .6 | | | | | | .6 |
| 1 | 2 | | 4.5 | 1 | 2.3 | .7 | .5 | .4 | .4 | .4 | .4 | .4 | | | | | | .4 |
| 2 | 1 | | 5.0 | 1 | 1.2 | .4 | .4 | .3 | .3 | .3 | .3 | .3 | | | | | | .3 |
| 2 | 2 | | 4.7 | 1 | 2.9 | 1.0 | .4 | .2 | .2 | .2 | .2 | .2 | | | | | | .2 |
| 3 | 1 | | 5.1 | 2 | 2.6 | 1.0 | .7 | .6 | .5 | .5 | .5 | .5 | .5 | | | | | .5 |
| 3 | 2 | | 4.6 | 1 | 1.3 | .3 | .2 | .2 | .2 | .2 | .2 | .2 | .2 | | | | | .2 |

Soil: **Plainfield loamy sand (Wisconsin)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 15 min. | 30 min. | 45 min. | 60 min. | 75 min. | 90 min. | 105 min. | 120 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | |
| 1 | 1 | | 4.2 | 5 | 4.1 | 4.1 | 4.0 | 4.1 | 4.1 | 4.1 | 4.1 | 4.0 | 4.0 |
| 1 | 2 | | 3.9 | 5 | 3.8 | 3.6 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| 2 | 1 | | 3.5 | 5 | 3.4 | 3.4 | 3.4 | 3.5 | 3.4 | 3.4 | 3.4 | 3.5 | 3.5 |
| 2 | 2 | | 4.0 | 6 | 3.9 | 3.9 | 3.9 | 3.9 | 3.8 | 4.0 | 4.0 | 3.9 | 3.9 |
| Wet run (July, 1965) | | | | | | | | | | | | | |
| 1 | 1 | | 4.0 | 0 | 3.9 | 3.7 | 3.6 | 3.6 | 3.7 | 3.7 | 3.8 | 3.8 | 3.7 |
| 1 | 2 | | 5.2 | 7 | 4.7 | 4.0 | 4.0 | 3.8 | 3.7 | 3.7 | 3.3 | 3.5 | 3.4 |
| 2 | 1 | | 4.9 | 10 | 4.5 | 5.1 | 4.8 | 4.8 | 4.8 | 4.6 | 4.6 | 4.8 | 4.7 |
| 2 | 2 | | 3.6 | 5 | 3.4 | 3.0 | 2.9 | 3.0 | 2.8 | 2.9 | 3.0 | 7.0 | 2.9 |

*Appendix Table 1 (continued).*

Soil: **Russell silt loam (Indiana)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | |
| 1 | 1 | 21.0 | 4.6 | 7.5 | 4.6 | 4.6 | 1.9 | .8 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 1 | 2 | 21.1 | 4.6 | 3.5 | 4.6 | 3.3 | 1.2 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 1 | 21.2 | 3.4 | 3.0 | 4.0 | 1.6 | .6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 2 | 21.7 | 4.1 | 4.0 | 4.1 | 2.4 | .9 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 |
| 3 | 1 | 20.7 | 4.1 | 7.0 | 4.1 | 4.1 | 1.9 | 1.3 | 1.0 | .8 | .7 | .7 | .7 | .7 | .7 | .7 |
| 3 | 2 | 21.0 | 4.1 | 4.0 | 4.1 | 1.6 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| Wet run (June, 1961) | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.1 | 4.1 | 2.5 | 4.1 | 1.3 | .8 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 1 | 2 | 26.7 | 4.1 | 1.5 | 4.1 | 1.2 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 1 | 25.6 | 4.1 | 2.5 | 4.1 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 2 | 26.8 | 4.1 | 1.5 | 4.1 | 1.1 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 |
| 3 | 1 | 29.6 | 4.1 | 1.0 | 2.8 | 1.2 | .8 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 |
| 3 | 2 | 28.4 | 4.6 | 1.0 | 2.9 | 1.2 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |

Soil: **Sharpsburg silty clay loam (Nebraska)** Crop stage: Corn, 6 to 12 inches tall, removed

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 25 min. | 35 min. | 45 min. | 55 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1963) | | | | | | | | | | | |
| 1 | | 20.9 | 4.1 | 12.0 | | 4.0 | 4.1 | 4.1 | 3.9 | 3.1 | 3.1 |
| 2 | | 20.5 | 5.0 | 10.0 | | 5.0 | 5.0 | 4.8 | 4.5 | 4.3 | 4.3 |
| 3 | | 23.0 | 4.4 | 8.0 | 4.2 | 3.5 | 3.2 | 3.4 | 3.7 | 3.9 | 3.7 |
| 4 | | 21.4 | 5.2 | 12.5 | | 3.8 | 3.0 | 2.6 | 2.3 | 2.3 | 2.3 |
| Wet run (June, 1963) | | | | | | | | | | | |
| 1 | | FC | 4.6 | 4.0 | 3.9 | 1.8 | 1.6 | 1.5 | 1.1 | 1.2 | 1.2 |
| 2 | | FC | 5.3 | 8.0 | 5.0 | 3.8 | 3.0 | 2.2 | 2.3 | 2.2 | 2.2 |
| 3 | | FC | 4.4 | 2.0 | 1.2 | .6 | .6 | .6 | .5 | .6 | 1.0 |
| 4 | | FC | 5.0 | 2.0 | 2.1 | 1.5 | 1.4 | 1.5 | 1.6 | 1.1 | .9 |

FC=field capacity.

*Appendix Table 1 (continued).*

Soil: **Sims loam (Michigan)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | 85.5 min. | 95.5 min. | 125.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 14.8 | 5.0 | 17.0 | 4.9 | 4.8 | 4.6 | 4.2 | 4.1 | 3.2 | 3.0 | 2.7 | 2.7 | 2.4 | 2.4 | 2.2 | 2.1 | 1.9 | 1.7 | 1.5 | | 1.5 |
| 1 | 2 | 14.9 | 4.8 | 48.0 | 3.8 | 4.2 | 4.1 | 3.5 | 3.7 | 3.5 | 3.5 | 3.4 | 3.4 | 3.5 | 3.1 | 2.5 | 2.4 | 2.5 | | | | 2.5 |
| 2 | 1 | 13.8 | 4.3 | 33.0 | 3.9 | 4.1 | 3.7 | 3.4 | 2.8 | 3.2 | 2.8 | 2.6 | 2.7 | 2.3 | 1.8 | 1.7 | 1.9 | 1.8 | 1.5 | 1.5 | | 1.5 |
| 2 | 2 | 14.2 | 5.3 | 4.0 | 4.9 | 4.0 | 3.0 | 2.9 | 2.6 | 2.7 | 2.5 | 2.5 | | | | | | | | | | 2.5 |
| 3 | 1 | 12.4 | 5.0 | 22.0 | 4.7 | 4.0 | 3.7 | 3.3 | 3.1 | 3.4 | 3.0 | 3.1 | 2.3 | 1.5 | 1.5 | 1.7 | 2.5 | | | | | 2.5 |
| 3 | 2 | 13.2 | 4.6 | 7.0 | 4.4 | 4.5 | 4.4 | 4.1 | 3.9 | 3.9 | 3.9 | 3.7 | 3.8 | 3.7 | 3.5 | 3.5 | 3.4 | 3.1 | 2.6 | 2.7 | 2.4 | 2.6 |
| Wet run (June, 1961) | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.0 | 5.1 | .5 | 3.4 | 2.1 | 1.5 | 1.3 | 1.0 | .7 | .8 | .7 | 1.2 | | | | | | | | | .7 |
| 1 | 2 | 24.7 | 4.8 | 1.0 | 3.9 | 1.4 | 1.5 | 1.1 | 1.1 | .9 | .9 | .9 | | | | | | | | | | .9 |
| 2 | 1 | 22.8 | 4.3 | 1.0 | 1.9 | 1.0 | .5 | 1.2 | 1.0 | .6 | | | | | | | | | | | | .8 |
| 2 | 2 | 23.2 | 5.6 | 4.5 | 5.1 | 4.5 | 4.1 | 3.8 | 3.5 | 3.3 | 3.0 | 3.3 | 2.4 | 1.8 | 2.2 | 2.5 | 2.5 | | | | | 2.5 |
| 3 | 1 | 22.7 | 5.0 | 3.0 | 1.7 | .8 | .7 | .7 | .2 | | | | | | | | | | | | | .7 |
| 3 | 2 | 20.5 | 4.6 | 6.5 | 4.1 | 3.6 | 3.1 | 2.8 | 2.6 | 2.3 | 2.3 | 2.0 | 1.9 | 1.3 | 1.2 | 1.1 | 1.3 | | | | | 1.2 |

Soil: **Webster clay loam (Minnesota)** Crop stage: No crop

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 30 min. | 40 min. | 50 min. | 60 min. | 70 min. | 80 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | |
| 1 | 1 | 13.9 | 5.0 | 18 | | 4.0 | 2.1 | 2.0 | 2.0 | 2.0 | | | 2.0 |
| 1 | 2 | | 5.2 | 17 | | 4.5 | 3.1 | 2.3 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 |
| 2 | 1 | 12.0 | 5.1 | 16 | | 3.8 | 2.3 | 1.8 | 1.6 | 1.5 | 1.4 | | 1.4 |
| 2 | 2 | | 4.8 | 15 | | 3.7 | 2.2 | 1.4 | 1.2 | 1.2 | 1.2 | | 1.2 |
| 3 | 1 | 14.5 | 5.0 | 10 | | 4.3 | 3.4 | 2.5 | 2.1 | 2.0 | 1.9 | | 1.9 |
| 3 | 2 | | 4.3 | 23 | | | 3.9 | 2.8 | 2.2 | 2.5 | 1.9 | 1.9 | 1.9 |
| Wet run | | | | | | | | | | | | | |
| 1 | 1 | 20.8 | 4.9 | 6 | 1.7 | 1.1 | .8 | .8 | | | | | .8 |
| 1 | 2 | | 4.8 | 2 | 1.3 | 1.0 | value accepted--nozzle trouble | | | | | | 1.0 |
| 2 | 1 | 26.9 | 5.1 | 2 | 1.7 | 1.0 | 1.0 | 1.2 | 1.1 | 1.0 | | | 1.0 |
| 2 | 2 | | 4.6 | 2 | .8 | .6 | .7 | .7 | .7 | | | | .7 |
| 3 | 1 | 23.3 | 4.8 | 2 | 1.8 | 1.1 | 1.4 | 1.4 | 1.4 | | | | 1.4 |
| 3 | 2 | | 5.1 | 3 | 1.1 | .9 | .9 | .9 | .9 | | | | .9 |

*Appendix Table 1 (continued).*

Soil: **Withee silt loam (Wisconsin)** Crop stage: No crop

| Identification Rep. | Identification Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 15 min. | 30 min. | 45 min. | 60 min. | 75 min. | 90 min. | 105 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1963) | | | | | | | | | | | | |
| 1 | 1 | 6.8 | 4.9 | 4 | 4.5 | 3.3 | .7 | 1.6 | 0 | | | 0 |
| 1 | 2 | | 4.9 | 3 | 4.6 | 3.7 | 1.2 | .7 | .6 | | | .6 |
| 2 | 1 | | 4.4 | 9 | 4.2 | 4.2 | 3.3 | 2.1 | 1.6 | .9 | 1.2 | 1.2 |
| 2 | 2 | | 5.3 | 7 | 5.2 | 3.2 | .6 | .3 | | | | .3 |
| 3 | 1 | | 5.2 | 9 | 5.1 | 4.6 | 2.9 | 1.4 | .6 | .7 | | .6 |
| 3 | 2 | | 5.3 | 4 | 5.0 | 3.2 | 2.0 | .8 | .5 | | | .5 |
| Wet run (August, 1963) | | | | | | | | | | | | |
| 1 | 1 | 12.1 | 4.8 | 2 | 2.8 | .2 | | 0 | | | | 0 |
| 1 | 2 | | 4.4 | 2 | 2.6 | .8 | .3 | | | | | 0 |
| 2 | 1 | | 4.8 | 5 | 3.3 | 1.6 | .9 | .7 | | | | .7 |
| 2 | 2 | | 4.4 | 4 | 2.0 | | | | | | | 0 |
| 3 | 1 | | 5.0 | 3 | 3.5 | .6 | .4 | .9 | | | | .6 |
| 3 | 2 | | 5.1 | 1 | 1.6 | | | | | | | 0 |

*Appendix Table 2. Moisture Infiltration Rates on Soils With Clipped Bromegrass Treatment*

Soil: **Bearden silty clay loam (North Dakota)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 32.5 min. | 37.5 min. | 42.5 min. | 47.5 min. | 57.5 min. | 67.5 min. | 77.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | | 24.9 | 4.4 | 10 | 4.4 | 4.4 | 3.0 | 2.0 | 1.7 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 |
| 2 | | 24.5 | 4.3 | 5 | 4.3 | 3.1 | 2.6 | 2.2 | 1.9 | 1.8 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 |
| 3 | | 30.0 | 4.5 | 11 | 4.5 | 4.5 | 4.1 | 3.0 | 2.6 | 2.4 | 2.2 | 2.0 | 1.9 | 1.8 | 1.6 | 1.4 | 1.4 | 1.4 |
| Wet run (June, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | | 37.0 | 4.5 | 5 | 4.5 | 3.0 | 1.4 | 1.2 | 1.1 | 1.0 | 1.0 | .9 | .9 | .9 | .9 | | | .9 |
| 2 | | 37.7 | 4.6 | 6 | 4.6 | 2.6 | 1.4 | 1.1 | 1.0 | .9 | .9 | .9 | .9 | .9 | | | | .9 |
| 3 | | 37.9 | 4.3 | 9 | 4.3 | 4.3 | 1.8 | 1.5 | 1.3 | 1.2 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | | 1.0 |

Soil: **Blount silty clay loam (Ohio)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Min. to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.4 | 3.7 | 14.2 | 3.6 | 3.6 | 3.6 | (14.6) 3.7 | 3.7 | 2.1 | 1.7 | .6 | .2 | .3 | 0 | | | 0 |
| 1 | 2 | 19.8 | 4.3 | 12.0 | 4.7 | 4.7 | 4.7 | (13.5) 4.2 | 3.1 | 2.6 | 2.0 | 1.3 | .6 | .5 | .8 | .4 | | .3 |
| 2 | 1 | 22.1 | 4.1 | 13.0 | 4.7 | 4.7 | 4.7 | (14.0) 3.8 | 3.6 | 3.6 | 3.4 | 2.6 | 1.8 | 1.4 | .9 | 1.0 | .5 | .7 |
| 2 | 2 | 26.1 | 4.1 | 10.0 | 4.3 | 4.3 | 4.3 | 3.7 | 3.5 | 3.1 | 2.8 | 2.0 | 1.3 | 1.1 | 1.0 | .5 | .5 | .6 |
| 3 | 1 | 15.2 | 4.2 | 17.5 | 4.4 | 4.4 | 4.4 | 4.4 | (18.8) 3.5 | 2.9 | 2.3 | 1.9 | 1.5 | 1.3 | 1.4 | 1.0 | 1.0 | .9 |
| 3 | 2 | 21.9 | 3.7 | 14.0 | 3.8 | 3.8 | 3.8 | (14.5) 3.5 | 3.2 | 3.2 | 3.0 | 2.4 | 1.9 | 1.3 | 1.1 | 1.0 | .8 | .9 |
| Wet run (June-July, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 31.9 | 4.7 | 4.2 | 4.8 | (4.6) 3.2 | .6 | .4 | .7 | .4 | .7 | .5 | .2 | | .5 | | .4 | .2 |
| 1 | 2 | 30.1 | 4.5 | 4.0 | 4.8 | (4.5) 1.0 | 1.3 | .1 | .6 | .4 | .2 | .2 | | .1 | .4 | .2 | | .1 |
| 2 | 1 | 29.7 | 4.4 | 9.5 | 4.6 | 4.6 | (9.8) 2.5 | 2.7 | .7 | .8 | .8 | .6 | .7 | .9 | .4 | .6 | .8 | .4 |
| 2 | 2 | 36.7 | 4.3 | 7.0 | 4.2 | 4.2 | (8.5) 3.6 | 2.5 | 2.2 | 1.4 | 1.6 | .4 | .4 | .7 | .4 | .2 | .5 | .3 |
| 3 | 1 | 34.9 | 4.8 | 8.5 | 4.9 | 4.9 | (9.3) 2.7 | 1.2 | .6 | 1.0 | .6 | .9 | .5 | .6 | .7 | .4 | .4 | .4 |
| 3 | 2 | 35.5 | 4.2 | 5.5 | 4.1 | 4.1 | (7.8) 2.8 | 1.0 | .5 | .2 | .4 | .5 | .6 | .2 | .1 | | | .1 |

*Appendix Table 2 (continued).*

Soil: **Bodenburg silt loam (Alaska)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (1964) | | | | | | | | | | | | | |
| 1 | 1 | 31.1 | 4.1 | 2.0 | 1.6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 1 | 2 | 30.3 | 4.3 | 2.0 | 1.8 | .6 | .7 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 1 | 31.0 | 4.1 | 3.0 | 2.8 | 1.6 | .9 | .5 | .5 | .5 | .5 | | .5 |
| 2 | 2 | 29.2 | 4.1 | 2.0 | 1.6 | .6 | .6 | .6 | .6 | .6 | .6 | | .6 |
| 3 | 1 | 30.4 | 4.0 | 3.5 | 2.4 | 1.2 | .9 | .9 | .9 | .9 | .9 | .9 | .9 |
| 3 | 2 | 28.3 | 4.4 | 2.5 | 2.4 | 1.4 | .8 | .8 | .8 | .8 | .8 | .8 | .8 |
| Wet run (1964) | | | | | | | | | | | | | |
| 1 | 1 | 51.0 | 4.2 | 2.0 | 1.8 | .6 | .6 | .6 | .6 | .6 | | | .6 |
| 1 | 2 | 50.2 | 4.2 | 2.0 | 1.4 | .6 | .2 | .2 | .2 | .2 | | | .2 |
| 2 | 1 | 55.4 | 4.2 | 2.0 | 1.8 | .7 | .6 | .6 | .6 | .6 | | | .6 |
| 2 | 2 | | | | | | | | | .3[a] | | | .3[a] |
| 3 | 1 | 49.9 | 4.0 | 3.0 | 2.9 | 1.6 | .5 | .4 | .4 | .4 | | | .4 |
| 3 | 2 | 46.2 | 4.4 | 2.0 | 2.4 | .8 | .3 | .3 | .3 | .3 | | | .3 |

[a]Missing value determined by method for missing plots.

Soil: **Canfield silt loam (Ohio)** Crop stage: Clipped (third-year sod)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 0 min. | | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June-July, 1964) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 35.6 | 2.8 | 4.0 | 3.6 | (4.5) | 3.2 | 1.5 | 1.2 | 1.3 | 1.2 | 1.6 | 1.1 | .6 | | | | .5 |
| 1 | 2 | 34.3 | 3.4 | 2.2 | 3.6 | (3.6) | 2.6 | 1.5 | .9 | 1.1 | .6 | .7 | .8 | | | | | .3 |
| 2 | 1 | 37.7 | 4.6 | 2.0 | 4.8 | (3.5) | 2.8 | 2.0 | 1.6 | 1.2 | 1.3 | 1.5 | | | | | | .6 |
| 2 | 2 | 38.8 | 4.8 | 3.2 | 4.9 | (4.1) | 3.9 | 2.6 | 2.1 | 1.7 | .7 | .7 | .8 | | | | | .3 |
| 3 | 1 | 30.7 | 4.6 | 3.0 | 4.7 | (4.0) | 3.0 | 2.8 | 2.5 | 1.8 | 1.8 | 1.6 | 1.5 | .7 | 1.2 | 1.2 | 1.0 | .9 |
| 3 | 2 | 30.6 | 4.1 | 3.8 | 4.0 | (4.4) | 2.7 | 1.7 | 1.4 | 1.1 | 1.0 | .8 | 1.0 | 1.0 | 1.0 | | | .6 |
| Wet run (June-July, 1964) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 36.1 | 3.6 | 2.2 | 3.5 | (3.6) | 2.6 | 2.2 | | 2.0 | 1.7 | 1.4 | 2.0 | 1.6 | 1.5 | | | 1.3 |
| 1 | 2 | 37.0 | 4.0 | 2.0 | 4.0 | (3.5) | 1.8 | 1.8 | 1.5 | 1.6 | 1.4 | 1.3 | 1.5 | | | | | .9 |
| 2 | 1 | 39.2 | 4.3 | 2.8 | 4.3 | (3.8) | 2.8 | 2.5 | 2.8 | 2.8 | 2.7 | 2.3 | 2.6 | 2.3 | 2.4 | | | 2.1 |
| 2 | 2 | 38.0 | 4.4 | 3.0 | 4.7 | (4.0) | 3.1 | 2.1 | 1.4 | 1.2 | 1.1 | 1.2 | 1.3 | | | | | .6 |
| 3 | 1 | 33.9 | 5.0 | 2.5 | 5.0 | (3.7) | 4.1 | 2.2 | 1.4 | 1.5 | 1.2 | 1.0 | 1.1 | 1.1 | 1.0 | | | .6 |
| 3 | 2 | 33.3 | 4.5 | 3.5 | 4.8 | (4.3) | 2.9 | 2.5 | 2.0 | 1.8 | 2.0 | 1.8 | 1.2 | | 1.7 | 1.1 | 1.2 | 1.1 |

*Appendix Table 2 (continued).*

Soil: **Cincinnati silt loam (Indiana)** Crop stage: Clipped (first-year sod)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.0 | 3.4 | 4.0 | 3.4 | 3.1 | 2.4 | 2.1 | 2.1 | 1.7 | 1.8 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 |
| 1 | 2 | 15.5 | 3.4 | 5.0 | 3.4 | 3.3 | 2.8 | 2.4 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.7 | 1.5 | 1.5 |
| 2 | 1 | 18.5 | 3.7 | 5.0 | 3.7 | 2.9 | 1.9 | 1.6 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| 2 | 2 | 21.7 | 3.7 | 5.0 | 3.7 | 2.9 | 1.8 | 1.5 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| 3 | 1 | 18.7 | 3.7 | 5.5 | 3.7 | 3.7 | 2.9 | 1.5 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| 3 | 2 | 17.6 | 3.6 | 5.0 | 3.6 | 3.5 | 2.1 | 1.6 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| Wet run (August, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 30.5 | 3.2 | 4.0 | 3.2 | 1.7 | 1.5 | 1.5 | 1.4 | 1.2 | 1.2 | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 |
| 1 | 2 | 27.7 | 3.2 | 4.5 | 3.2 | 2.2 | 1.5 | 1.5 | 1.5 | 1.4 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 2 | 1 | 26.1 | 3.2 | 3.0 | 3.2 | 2.0 | 1.1 | .9 | .9 | .9 | .9 | .9 | .8 | .8 | .8 | .8 | .8 | .8 |
| 2 | 2 | 25.8 | 3.2 | 4.5 | 3.2 | 2.3 | 1.4 | 1.2 | 1.1 | 1.1 | 1.0 | .9 | .9 | .9 | .9 | .9 | .9 | .9 |
| 3 | 1 | 27.3 | 3.4 | 4.0 | 3.4 | 2.5 | 1.8 | 1.6 | 1.6 | 1.4 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 3 | 2 | 22.7 | 3.4 | 4.0 | 3.4 | 2.6 | 1.9 | 1.7 | 1.6 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |

Soil: **Cisne silt loam (Illinois)**[a] Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July-October, 1963) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 9.4 | 4.0 | 34 | 2.3 | 2.3 | 2.3 | 2.1 | 2.2 | 2.1 | 2.0 | 1.8 | 1.7 | 1.6 | 1.5 | 1.4 | 1.4 |
| 1 | 2 | 12.0 | 4.7 | 12 | 3.2 | 2.5 | 1.2 | 1.0 | .8 | .8 | .8 | .8 | | | | | .8 |
| 2 | 1 | 7.6 | 4.1 | 29 | 3.5 | 3.4 | 3.0 | 2.8 | 2.2 | equipment failure | | | | | | | |
| 2 | 2 | 10.6 | 4.4 | 13 | 2.2 | 1.7 | 1.2 | 1.7 | 1.9 | 1.8 | 1.5 | .9 | .8 | .8 | .8 | | .8 |
| 3 | 1 | 13.1 | 4.3 | 11 | 3.1 | 3.1 | 2.6 | 2.5 | 2.1 | 2.2 | 2.1 | 1.9 | 1.8 | 1.6 | 1.6 | 1.6 | 1.6 |
| 3 | 2 | 11.6 | 3.5 | 12 | 1.6 | 1.1 | .8 | .8 | .7 | .6 | .7 | .6 | .6 | .5 | | | .6 |
| Wet run | | | | | | | | | | | | | | | | | |
| 1 | 1 | 26.9 | 3.8 | 20 | 1.2 | 1.2 | .9 | 1.0 | 1.1 | 1.0 | .9 | .7 | .6 | .6 | .5 | .4 | .4 |
| 1 | 2 | 22.2 | 4.4 | 11 | 3.6 | 3.0 | 2.1 | 1.7 | 1.4 | 1.4 | 1.3 | 1.2 | 1.3 | 1.3 | | | 1.2 |
| 2 | 1 | 26.7 | 4.0 | 14 | 3.1 | 2.6 | 2.1 | 1.9 | 1.8 | 1.8 | 1.7 | 1.5 | 1.2 | 1.0 | .8 | .5 | .6 |
| 2 | 2 | 24.2 | 3.9 | 11 | 3.3 | 2.9 | 2.3 | 2.0 | 1.7 | 1.7 | 1.6 | 1.6 | 1.4 | 1.2 | 1.1 | 1.0 | 1.0 |
| 3 | 1 | missing data | | | | | | | | | | | | | | | .5[b] |
| 3 | 2 | 22.3 | 4.3 | 11 | 1.9 | 1.4 | .7 | .5 | .6 | .4 | .4 | .3 | .3 | .4 | .4 | | .3 |

[a]Data pooled from Brownstown and Toledo experiment fields because of weather and equipment problems. Dup. 1's are Brownstown, Dup. 2's are Toledo.
[b]Calculated missing value.

*Appendix Table 2 (continued).*

Soil: **Clermont silt loam (Indiana)** Crop stage: Clipped (first-year sod)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 20.2 | 3.3 | 5.5 | 3.3 | 3.3 | 1.1 | .7 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 1 | 2 | 18.8 | 3.4 | 5.5 | 3.4 | 3.4 | .9 | .8 | .7 | .6 | .6 | .5 | .4 | .4 | .4 | .4 | .4 | .4 |
| 2 | 1 | 19.8 | 3.3 | 5.0 | 3.3 | 3.1 | 2.0 | 1.3 | 1.1 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 |
| 2 | 2 | 24.5 | 3.3 | 3.5 | 3.3 | 2.3 | 1.3 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 |
| 3 | 1 | 18.8 | 3.8 | 3.0 | 3.8 | 1.8 | 1.1 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | .9 | | | .9 |
| 3 | 2 | 18.0 | 3.4 | 3.5 | 3.4 | 1.9 | .8 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| Wet run (June, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.3 | 3.6 | 5.0 | 3.6 | 3.2 | 1.3 | .7 | .5 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 |
| 1 | 2 | 22.9 | 3.4 | 3.5 | 3.4 | 2.4 | 1.5 | 1.2 | 1.0 | .9 | .8 | .7 | .7 | .6 | .6 | .6 | .6 | .6 |
| 2 | 1 | 22.4 | 3.4 | 3.5 | 3.4 | 2.4 | 1.6 | 1.4 | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 2 | 2 | 22.2 | 3.4 | 2.5 | 3.4 | 1.7 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| 3 | 1 | 21.1 | 3.4 | 3.0 | 3.4 | 1.3 | .6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| 3 | 2 | 20.7 | 3.7 | 2.5 | 3.7 | 1.3 | .9 | .8 | .7 | .7 | .6 | .5 | .5 | .5 | .5 | | | .5 |

Soil: **Dudley clay loam (South Dakota)** Crop stage: Four inches high (dormant)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 3 min. | 8 min. | 13 min. | 18 min. | 23 min. | 28 min. | 33 min. | 38 min. | 43 min. | 48 min. | 53 min. | 58 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1963) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 19.8 | 3.5 | 20.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.1 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | |
| 1 | 2 | 19.8 | 4.0 | 20.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.9 | 3.6 | 3.3 | 3.3 | 3.0 | 2.7 | 2.9 | 3.1 | |
| 2 | 1 | 19.8 | 4.4 | 8.0 | 4.4 | 4.3 | 3.7 | 2.8 | 2.4 | 2.3 | 2.4 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | |
| 2 | 2 | 19.8 | 4.5 | 7.0 | 4.5 | 3.5 | 2.5 | 2.3 | 1.9 | 1.8 | 1.4 | 1.5 | 1.4 | 1.4 | | | |
| 3 | 1 | 19.8 | 3.3 | 5.0 | 3.3 | 2.5 | 1.7 | 1.6 | 1.7 | 1.6 | 1.5 | 1.4 | 1.5 | 1.5 | 1.5 | 1.3 | |
| 3 | 2 | 19.8 | 4.0 | 20.5 | 4.0 | 4.0 | 4.0 | 4.0 | 3.5 | 3.0 | 2.7 | 2.7 | 2.6 | 2.1 | 2.2 | | |
| Wet run (August, 1963) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 41.5 | 3.7 | 7.2 | 3.7 | 2.3 | 1.0 | 1.1 | .6 | .6 | .5 | .2 | | | | | .4 |
| 1 | 2 | 38.0 | 4.6 | 6.8 | 4.6 | 3.5 | 1.6 | 1.4 | 1.1 | 1.3 | 1.3 | | | | | | 1.2 |
| 2 | 1 | 38.4 | 4.6 | 6.8 | 4.6 | 1.7 | 1.2 | .7 | .3 | .6 | .9 | | | | | | .6 |
| 2 | 2 | 37.7 | 4.9 | 4.8 | 4.9 | 2.0 | 1.4 | .3 | .9 | .9 | | | | | | | .7 |
| 3 | 1 | 40.8 | 5.1 | 4.0 | 5.1 | 2.6 | 1.6 | 1.4 | 2.1 | 1.9 | 1.5 | | | | | | 1.6 |
| 3 | 2 | 41.0 | 4.9 | 9.8 | 5.1 | 5.1 | 1.8 | 1.4 | 1.1 | 1.6 | 1.6 | 1.8 | | | | | 1.4 |

*Appendix Table 2 (continued).*

Soil: **Elliott silt loam (Illinois)** Crop stage: Alfalfa, clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.4 | 5.8 | 17 | 4.4 | 4.4 | 4.3 | 4.2 | 4.1 | 4.1 | 4.0 | 4.0 | 3.9 | 3.8 | 3.5 | 2.8 | 2.8 |
| 1 | 2 | 23.8 | 4.7 | 18 | 4.6 | 4.6 | 4.5 | 4.4 | 4.1 | 3.2 | 2.8 | 2.2 | 1.9 | 1.7 | 1.5 | 1.2 | 1.1 |
| 2 | 1 | 23.3 | 5.9 | 5 | 4.6 | 4.5 | 4.4 | 4.2 | 4.1 | 3.8 | 3.4 | 3.2 | 3.0 | 2.8 | 2.5 | 1.9 | 2.1 |
| 2 | 2 | 25.0 | 5.7 | 7 | 5.6 | 5.6 | 5.5 | 5.5 | 5.5 | 5.5 | 5.4 | 5.2 | 4.4 | 3.8 | 3.4 | 2.6 | 2.0 |
| 3 | 1 | 31.8 | 5.3 | 4 | 5.3 | 5.2 | 5.1 | 5.0 | 4.9 | 4.7 | 4.4 | 4.0 | 3.7 | 3.4 | 3.2 | 3.0 | 3.0 |
| 3 | 2 | 26.2 | 5.9 | 9 | 5.5 | 5.2 | 4.9 | 4.6 | 4.5 | 4.1 | 3.7 | 3.1 | 2.8 | 2.4 | 2.3 | 2.6 | 1.8 |
| Wet run (July, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 29.9 | 5.9 | 6 | 3.8 | 3.2 | 2.5 | 2.5 | 2.3 | 2.1 | 1.9 | 1.8 | 1.9 | 2.2 | 2.1 | 1.9 | 1.9 |
| 1 | 2 | 26.6 | 5.5 | 5 | 3.5 | 3.4 | 3.1 | 2.7 | 2.4 | 2.3 | 2.3 | 2.2 | 2.0 | 1.9 | 1.7 | 1.5 | 1.4 |
| 2 | 1 | 29.1 | 5.8 | 4 | 3.3 | 3.1 | 2.6 | 2.2 | 2.1 | 2.0 | 1.9 | 1.7 | 1.7 | 1.6 | 1.5 | 2.1 | 1.4 |
| 2 | 2 | 25.7 | 5.7 | 4 | 5.1 | 4.4 | 3.3 | 2.6 | 2.2 | 1.8[a] | 1.0[a] | .7[a] | .6[a] | .7[a] | | | |
| 3 | 1 | 30.5 | 5.7 | 3 | 4.8 | 4.6 | 4.5 | 4.4 | 4.2 | 4.1 | 3.8 | 3.8 | 3.5 | 3.3 | 3.2 | 2.8 | 2.4 |
| 3 | 2 | 26.7 | 6.5 | 2 | 5.1 | 4.8 | 4.3 | 3.5 | 3.2 | 3.1 | 2.9 | 2.9 | 2.9 | 3.0 | 3.0 | 2.8 | 2.8 |

[a]Mechanical failure.

Soil: **Emmet loamy sand (Michigan)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1961) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 7.8 | 5.3 | 1.5 | 4.0 | 3.7 | 3.6 | 3.5 | 3.7 | 3.5 | 3.7 | 3.8 | 3.8 | 3.8 | 3.8 | | 3.8 |
| 1 | 2 | 9.4 | 5.5 | 4.0 | 4.8 | 4.4 | 4.0 | 3.9 | 3.9 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 | 3.8 | | 3.8 |
| 2 | 1 | 7.1 | 5.1 | 4.0 | 4.9 | 4.6 | 3.7 | 3.7 | 3.6 | 3.7 | 3.7 | 3.6 | 3.6 | 3.6 | | | 3.6 |
| 2 | 2 | 9.5 | 5.0 | 5.0 | 3.8 | 2.4 | 1.7 | 1.8 | 2.0 | 1.7 | 2.1 | | | | | | 2.1 |
| 3 | 1 | 9.9 | 5.3 | 5.0 | 4.6 | 4.0 | 3.9 | 3.9 | 3.7 | 3.9 | 3.6 | 3.8 | 3.9 | 3.6 | 3.8 | 3.9 | 3.8 |
| 3 | 2 | 11.0 | 4.8 | 4.0 | 1.7 | 1.9 | 1.2 | 1.6 | 2.0 | 2.2 | 1.8 | | | | | | 1.8 |
| Wet run (July, 1961) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 12.9 | 5.3 | 3.0 | 4.5 | 3.0 | 2.1 | 1.9 | 1.6 | 1.8 | | | | | | | 1.8 |
| 1 | 2 | 11.8 | 5.4 | 1.0 | 3.7 | 3.6 | 3.6 | 3.6 | 3.7 | 3.5 | 3.3 | 3.3 | 3.3 | 3.4 | | | 3.3 |
| 2 | 1 | 12.2 | 5.1 | 2.0 | 4.8 | 2.9 | 1.4 | 1.3 | 1.3 | 1.1 | 1.1 | 1.2 | | | | | 1.1 |
| 2 | 2 | 13.9 | 5.2 | 5.0 | 3.9 | 1.0 | 1.0 | 1.0 | 1.3 | 1.1 | | | | | | | 1.0 |
| 3 | 1 | 13.6 | 5.4 | .5 | 3.0 | 2.4 | 2.2 | 2.1 | 2.2 | 1.3 | | | | | | | 2.2 |
| 3 | 2 | 13.2 | 4.8 | 1.0 | 4.1 | 1.8 | .6 | .8 | .7 | | | | | | | | .7 |

Soil: **Fayette silt loam (Wisconsin)** Crop stage: Bluegrass, clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 15 min. | 30 min. | 45 min. | 60 min. | 75 min. | 90 min. | 105 min. | 120 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1965) | | | | | | | | | | | | | |
| 1 | 1 | 12.3 | 3.8 | 10 | 3.8 | 3.0 | 2.0 | 1.4 | 1.2 | 1.1 | 1.0 | .6 | .6 |
| 1 | 2 | | 4.2 | 8 | 3.8 | 3.2 | 2.5 | 2.6 | 2.3 | 2.2 | 2.0 | 1.7 | 1.7 |
| 2 | 1 | | 3.9 | 12 | 3.7 | 2.4 | 2.0 | 1.7 | .4 | .8 | .7 | .7 | .7 |
| 2 | 2 | | 3.9 | 10 | 3.4 | 2.6 | 2.3 | 1.6 | 1.4 | 1.3 | 1.1 | .4 | .4 |
| Wet run (July, 1965) | | | | | | | | | | | | | |
| 1 | 1 | 14.4 | 3.8 | 8 | 3.0 | 1.6 | 1.2 | 1.4 | 1.3 | 1.4 | .9 | 1.3 | 1.1 |
| 1 | 2 | | 4.2 | 5 | 3.1 | 1.3 | 1.6 | 1.4 | 1.9 | .8 | 1.2 | .5 | .5 |
| 2 | 1 | | 3.9 | 10 | 3.1 | 1.4 | 1.0 | 1.2 | .3 | 1.2 | 1.2 | .5 | .5 |
| 2 | 2 | | 3.9 | 8 | 3.1 | 1.4 | .6 | 1.0 | .8 | .6 | .8 | .4 | .4 |

Soil: **Flanagan silt loam (Illinois)** Crop stage: Bluegrass, clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 9.2 | 4.6 | 9 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.8 | 3.9 | 3.9 | 3.9 | 3.9 | 4.0 | 3.9 |
| 1 | 2 | 8.4 | 4.1 | 7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.4 | 3.4 | 3.5 |
| 2 | 1 | 9.8 | 3.8 | 11 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| 2 | 2 | 8.7 | 4.5 | 10 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.0 | 4.0 | 3.9 | 3.9 | 3.9 | 3.9 | 3.8 | 3.9 |
| 3 | 1 | 9.9 | 4.6 | 9 | 4.0 | 4.0 | 4.0 | 4.0 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 4.0 | 4.0 | 4.2 | 4.0 |
| 3 | 2 | 9.6 | 4.2 | 8 | 3.8 | 3.8 | 3.9 | 3.9 | 3.9 | 3.9 | 3.9 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Wet run (August, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 28.0 | 3.9 | 4 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.4 |
| 1 | 2 | 30.5 | 3.9 | 8 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 |
| 2 | 1 | 29.8 | 4.5 | 11 | 4.4 | 4.4 | 4.4 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.2 | 4.3 |
| 2 | 2 | 29.6 | 4.3 | 6 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 |
| 3 | 1 | 28.7 | 4.6 | 12 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 |
| 3 | 2 | 32.2 | 4.3 | 6 | 3.6 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.6 | 3.6 | 3.5 | 3.5 | 3.6 | 3.7 | 3.5 |

*Appendix Table 2 (continued).*

Soil: **Grundy silt loam (Iowa)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff. | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate[a] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 34.2 | 4.2 | 15.0 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 2.8 | 2.0 | 2.1 | 1.9 | 2.1 | 1.5 | 1.9 | 1.9 | 1.9 |
| 1 | 2 | 36.8 | 4.8 | 13.0 | 4.8 | 4.8 | 4.8 | 4.7 | 4.7 | 4.7 | 4.5 | 3.7 | 2.7 | 2.3 | 1.8 | 1.8 | 1.3 | 1.5 | 1.5 |
| 2 | 1 | 33.7 | 4.1 | 23.0 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 3.7 | 3.4 | 3.1 | 2.9 | 2.5 | 2.0 | 2.2 | 1.2 | 1.2 | 1.2 |
| 2 | 2 | 28.3 | 4.5 | 23.0 | 4.5 | 4.5 | 4.5 | 4.5 | 4.5 | 4.2 | 4.2 | 4.2 | 4.0 | 4.0 | 2.3 | 2.6 | 2.9 | 2.7 | 2.5 |
| 3 | 1 | 36.1 | 4.3 | 19.0 | 4.3 | 4.3 | 4.3 | 4.3 | 4.0 | 4.0 | 3.3 | 2.5 | 2.0 | 1.7 | 1.4 | .9 | .8 | .6 | .7 |
| 3 | 2 | 31.2 | 4.5 | 17.0 | 4.5 | 4.5 | 4.5 | 4.5 | 4.2 | 3.4 | 2.7 | 2.7 | 2.3 | 2.2 | 2.0 | 1.8 | 2.0 | 1.5 | 1.8 |
| Wet run (July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 36.4 | 4.5 | 8.5 | 4.5 | 4.5 | 2.6 | 2.0 | 1.8 | 2.0 | 1.8 | 1.8 | 2.4 | 2.4 | 2.3 | | | | 2.1 |
| 1 | 2 | 41.0 | 4.5 | 7.5 | 4.5 | 4.2 | 1.8 | 1.5 | 1.2 | 1.2 | 1.5 | 1.2 | 1.5 | 1.5 | | | | | .8 |
| 2 | 1 | | | | | | | | | | | | | | | | | | .4[b] |
| 2 | 2 | 40.0 | 4.6 | 6.0 | 4.6 | 4.5 | 3.1 | 1.5 | 1.2 | 1.3 | .6 | 1.2 | 1.3 | 1.1 | 1.3 | 1.3 | .5 | | .6 |
| 3 | 1 | 39.5 | 4.6 | 8.0 | 4.6 | 4.6 | 2.1 | .5 | .5 | .0 | .8 | .1 | .9 | .2 | .1 | | | | .1 |
| 3 | 2 | 35.4 | 4.4 | 13.0 | 4.4 | 4.4 | 4.4 | 3.2 | 2.5 | 2.5 | 2.2 | 2.3 | 2.1 | 2.3 | 2.2 | 1.9 | | | 1.9 |

[a]Wet-run equilibrium values calculated by applying field data to Phillip's (8) equation.

[b]Calculated missing value.

Soil: **Holdrege silt loam (Nebraska)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 15 min. | 25 min. | 35 min. | 45 min. | 55 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July-August, 1964) | | | | | | | | | | | |
| 1 | | 7.2 | 5.0 | 10.0 | | 4.3 | 4.0 | 4.0 | 3.5 | 3.5 | 3.5 |
| 2 | | 9.0 | 4.9 | 13.5 | | 4.6 | 3.1 | 2.1 | 2.4 | 2.1 | 2.1 |
| 3 | | 5.4 | 4.8 | 8.0 | 4.7 | 3.8 | 1.8 | 1.9 | 1.7 | | 1.7 |
| Wet run (July-August 1964) | | | | | | | | | | | |
| 1 | | FC | 4.2 | 10.0 | | 1.8 | 1.7 | 1.2 | 1.4 | 1.4 | 1.4 |
| 2 | | FC | 5.2 | 7.0 | 4.5 | 1.8 | 1.4 | 1.6 | 1.5 | 1.5 | 1.5 |
| 3 | | FC | 4.3 | 7.0 | 3.9 | 2.0 | .6 | .4 | .7 | .5 | .5 |

FC=field capacity.

*Appendix Table 2 (continued).*

Soil: **Hoytville clay (Ohio)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Min. to initial runoff | Mean rate, in/hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | 95.0 min. | 105.0 min. | 115.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 18.6 | 4.6 | 2.5 | 4.6 | (3.7)4.4 | 4.3 | 4.0 | 4.2 | 4.2 | 4.2 | 4.4 | 4.2 | 4.4 | 4.3 | 4.2 | | | | | 4.2 |
| 1 | 2 | 20.7 | 4.4 | 1.5 | 4.8 | (3.3)4.5 | 4.5 | 4.0 | 4.0 | 4.0 | 4.1 | 3.9 | 4.2 | 3.9 | 4.2 | 4.3 | 4.4 | 3.5 | 2.4 | 1.6 | 4.2 |
| 2 | 1 | 18.8 | 3.8 | 20.0 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.8 | 3.8 | 3.6 | 3.6 | 3.8 | 3.6 | 3.6 | 3.6 | | | | 3.6 |
| 2 | 2 | 19.1 | 4.7 | 16.0 | 4.8 | 4.8 | 4.8 | 4.8 | (18.0)4.7 | 4.7 | 4.7 | 4.7 | 4.6 | 4.7 | 4.5 | 4.6 | 4.5 | 4.7 | 4.8 | 4.6 | 4.6 |
| 3 | 1 | 16.6 | 4.8 | 17.0 | 4.6 | 4.6 | 4.6 | 4.6 | (18.5)4.4 | 4.5 | 4.4 | 4.8 | 4.8 | 5.0 | 4.6 | 4.8 | 4.6 | 4.7 | 4.3 | 4.0 | 4.5 |
| 3 | 2 | 21.5 | 4.4 | 4.0 | 4.9 | (4.5)4.5 | 4.4 | 3.9 | 3.8 | 3.7 | 3.5 | 3.7 | 3.8 | 3.7 | 3.8 | 4.2 | 3.9 | 3.9 | 4.0 | 3.7 | 3.8 |
| Wet run (July, 1964) | | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 37.4 | 4.3 | 6.5 | 4.6 | 4.6 | (8.3)4.0 | 2.4 | 1.9 | 1.3 | 1.2 | 1.0 | 1.0 | | | | | | | | .8 |
| 1 | 2 | 39.5 | 4.4 | 5.0 | 4.6 | 4.6 | 3.5 | 1.9 | 1.3 | .9 | .9 | .6 | .7 | .3 | | | | | | | .2 |
| 2 | 1 | 36.8 | 4.2 | 10.0 | 4.4 | 4.4 | 4.4 | 3.7 | 3.2 | 2.8 | 2.1 | 1.6 | 1.1 | 1.1 | | | | | | | .7 |
| 2 | 2 | 37.0 | 4.2 | 14.5 | 4.2 | 4.2 | 4.2 | (14.8)4.2 | 4.2 | 4.0 | 3.7 | 3.2 | 2.7 | 2.4 | | | | | | | 2.1 |
| 3 | 1 | 32.2 | 4.4 | 9.5 | 4.8 | 4.8 | (9.8)3.9 | 3.4 | 2.5 | 2.0 | 1.4 | 1.1 | 1.4 | 1.2 | .9 | 1.3 | .9 | | | | .8 |
| 3 | 2 | 34.4 | 4.5 | 4.0 | 4.4 | (4.5)4.0 | 3.8 | 3.8 | 3.7 | 3.1 | 2.6 | 2.0 | 1.7 | 1.7 | 1.5 | 1.5 | | | | | 1.5 |

Soil: **Ida silt loam (Iowa)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June-July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 30.8 | 4.5 | 3.0 | 4.5 | 3.1 | 1.8 | 1.9 | 1.8 | 1.1 | 1.5 | 1.5 | 1.1 | 1.6 | 1.4 | 1.2 | .8 | | 1.2 |
| 1 | 2 | 30.4 | 4.5 | 6.0 | 4.5 | 4.0 | 2.3 | 1.8 | 2.0 | 1.8 | 1.4 | 1.8 | 1.5 | 1.5 | 1.8 | 2.1 | | | 1.5 |
| 2 | 1 | 28.0 | 4.5 | 4.5 | 4.5 | 3.7 | 2.3 | 1.8 | 1.2 | 1.2 | 1.4 | 1.2 | 1.4 | 1.5 | 1.2 | 1.2 | .8 | | 1.2 |
| 2 | 2 | 18.4 | 4.2 | 4.5 | 4.2 | 4.1 | 3.7 | 3.2 | 3.0 | 2.6 | 2.4 | 2.7 | 2.1 | 2.0 | 2.0 | 2.4 | 2.1 | 2.1 | 2.1 |
| 3 | 1 | 14.3 | 4.2 | 10.0 | 4.2 | 4.2 | 3.7 | 2.4 | 2.0 | 2.0 | 1.6 | 1.5 | 1.6 | 1.7 | 1.5 | 1.9 | 1.7 | 2.0 | 1.7 |
| 3 | 2 | 15.0 | 4.2 | 4.0 | 4.2 | 3.7 | 2.8 | 2.1 | 2.1 | 2.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.5 | 1.5 |
| Wet run (June-July, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.4[a] | 4.4 | 4.5 | 4.4 | 3.2 | 1.8 | 1.4 | 1.4 | 1.4 | 1.1 | 1.1 | 1.4 | 1.3 | 1.3 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1 | 2 | 33.4 | 4.4 | 6.5 | 4.4 | 3.9 | 2.5 | 2.2 | 1.8 | 2.2 | 2.1 | | | 1.8 | 1.7 | 1.4 | 1.9 | 1.4 | 1.5 |
| 2 | 1 | 32.4 | 4.0 | 5.0 | 4.0 | 3.5 | 2.2 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.3 | 1.5 | 1.5 | 1.5 | | | 1.3 |
| 2 | 2 | 27.6 | 4.1 | 8.0 | 4.1 | 4.1 | 4.0 | 3.4 | 3.0 | 2.7 | 2.7 | 2.7 | 2.7 | 2.5 | 2.7 | 2.5 | 2.5 | 2.7 | 2.4 |
| 3 | 1 | 24.7 | 4.1 | 7.0 | 4.1 | 4.0 | 1.3 | 2.5 | 2.3 | 2.3 | 2.2 | 2.0 | 2.2 | 1.9 | 2.0 | 1.9 | 1.8 | 2.0 | 2.0 |
| 3 | 2 | 28.7 | 4.2 | 4.5 | 4.2 | 3.2 | 1.6 | 1.6 | 2.1 | 1.1 | 1.2 | .9 | 1.1 | 1.3 | 1.3 | 1.1 | | | .9 |

[a] This value appears to be in error.
[b] Wet-run equilibrium values calculated by applying field data to Phillip's (8) equation.

*Appendix Table 2 (continued).*

Soil: **Keith very fine sandy loam (Nebraska)** Crop stage: Intermediate wheatgrass

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. To 10 min. | 15 or to 20 min. | 25 or to 30 min. | 35 min. | 45 min. | 55 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1964) | | | | | | | | | | | |
| 1 | | 5.4 | 4.5 | 26 | | | 3.3 | 3.1 | 2.9 | 2.6 | |
| 2 | | 3.4 | 4.5 | 27 | | | 3.6 | 2.8 | 2.5 | | |
| 3 | | 2.5 | 4.0 | 25 | | | 3.5 | 3.6 | 3.6 | 2.8 | |
| Wet run (August, 1964) | | | | | | | | | | | |
| 1 | | FC | 4.4 | 12 | | 1.8 | 1.3 | 1.3 | 1.4 | 1.8 | 1.3 |
| 2 | | FC | 4.4 | 12 | | 2.9 | 2.1 | 2.1 | 2.1 | | 2.0 |
| 3 | | FC | 4.9 | 9 | 4.2 | 3.1 | 2.5 | 1.9 | 2.1 | 1.2 | |

FC = Field capacity.

Soil: **Kenyon silt loam (Minnesota)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 30 min. | 40 min. | 50 min. | 60 min. | 70 min. | 80 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1964) | | | | | | | | | | | | | |
| 1 | 1 | 10.0 | 5.6 | 10 | | 4.9 | 4.4 | 3.7 | 3.0 | 3.0 | | | 3.0 |
| 1 | 2 | | 5.2 | 21 | | | 4.7 | 3.3 | 2.3 | 1.7 | 1.6 | 1.6 | 1.6 |
| 2 | 1[a] | 19.2 | 4.5 | 25 | | | 2.7 | 1.8 | 1.4 | 1.1 | | | 1.1 |
| 2 | 2[a] | 23.5 | 4.4 | 20 | | | 2.6 | 2.1 | 1.9 | 1.9 | | | 1.9 |
| Wet run | | | | | | | | | | | | | |
| 1 | 1 | 23.1 | 4.0 | 9 | 3.7 | 2.0 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | | 1.4 |
| 1 | 2 | | 5.0 | 10 | | 1.6 | 1.2 | 1.3 | 1.3 | | | | 1.3 |
| 2 | 1[a] | 29.0 | 4.5 | 9 | 2.9 | 1.0 | .6 | .5 | | | | | .5 |
| 2 | 2[a] | 31.5 | 4.6 | 8 | 3.2 | 2.0 | 1.8 | 1.8 | 1.8 | | | | 1.8 |

[a]Data from 1963 experiments.

*Appendix Table 2 (continued).*

Soil: **Knik silt loam (Alaska)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (1964) | | | | | | | | | | | | | | | |
| 1 | 1 | 16.0 | 4.3 | 2.0 | 2.4 | 1.8 | 1.2 | .7 | .5 | .5 | .5 | .5 | .5 | | .5 |
| 1 | 2 | 17.0 | 4.1 | 2.5 | 2.7 | 2.0 | 1.7 | .8 | .6 | .6 | .6 | .6 | .6 | | .6 |
| 2 | 1 | 15.9 | 4.6 | 2.0 | 2.8 | 2.0 | 1.4 | .9 | .7 | .7 | .6 | .6 | .6 | .6 | .6 |
| 2 | 2 | 14.6 | 4.1 | 2.0 | 2.0 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| 3 | 1 | 16.4 | 4.0 | 3.0 | 2.4 | .9 | .5 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| 3 | 2 | 14.6 | 4.0 | 2.5 | 1.9 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| Wet run (1964) | | | | | | | | | | | | | | | |
| 1 | 1 | 43.1 | 4.5 | 1.5 | 2.5 | 1.1 | .5 | .2 | .2 | .2 | .2 | .2 | | | .2 |
| 1 | 2 | 52.9 | 4.4 | 2.0 | 2.0 | 5 | .4 | .4 | .4 | .4 | .4 | | | | .4 |
| 2 | 1 | 42.7 | 4.2 | 1.5 | 2.5 | .6 | .6 | .6 | .6 | .6 | .6 | | | | .6 |
| 2 | 2 | 43.3 | 4.1 | 2.0 | 2.0 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | | | .5 |
| 3 | 1 | 51.5 | 3.8 | 3.0 | 2.7 | .4 | .2 | .2 | .2 | .2 | .2 | .2 | | | .2 |
| 3 | 2 | 51.6 | 4.1 | 2.0 | 1.3 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | | | .4 |

Soil: **Kranzburg silty clay loam (South Dakota)** Crop stage: Eight inches high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 3 min. | 8 min. | 13 min. | 18 min. | 23 min. | 28 min. | 33 min. | 38 min. | 43 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June-July, 1963) | | | | | | | | | | | | | | |
| 1 | 1 | 20.4 | 4.9 | 6.2 | 4.9 | 2.6 | 1.4 | 1.4 | .7 | .4 | | | | |
| 1 | 2 | 20.4 | 4.4 | 10.0 | 4.4 | 4.4 | 2.8 | 1.6 | 2.0 | 1.9 | 1.5 | 1.5 | 1.0 | |
| 2 | 1 | 20.4 | 3.5 | 7.5 | 3.5 | .7 | .8 | .3 | .0 | .2 | .4 | | | |
| 2 | 2 | 20.4 | 4.7 | 8.0 | 4.7 | 1.6 | 1.8 | 1.4 | .9 | .6 | .7 | | | |
| 3 | 1 | 20.4 | 4.8 | 7.0 | 4.8 | 2.0 | .8 | .7 | 1.3 | .8 | | | | |
| 3 | 2 | 20.4 | 4.0 | 10.0 | 4.0 | 4.0 | .2 | 1.0 | .7 | .3 | | | | |
| Wet run (June-July, 1963) | | | | | | | | | | | | | | |
| 1 | 1 | 34.0 | 4.4 | 4.8 | 4.4 | 1.3 | 1.2 | .4 | 1.1 | .5 | | | | .5 |
| 1 | 2 | 30.3 | 4.4 | 4.5 | 4.4 | 2.5 | 2.2 | 2.3 | 1.9 | 1.2 | 1.5 | 1.6 | | 1.4 |
| 2 | 1 | 29.4 | 4.4 | 4.5 | 4.4 | 1.0 | .6 | 1.2 | .7 | .4 | | | | .7 |
| 2 | 2 | 37.8 | 5.0 | 5.0 | 5.0 | 1.3 | 1.2 | .4 | .6 | .7 | | | | .6 |
| 3 | 1 | 35.5 | 5.0 | 5.0 | 5.0 | 2.1 | 1.3 | 1.0 | 1.0 | .5 | | | | .8 |
| 3 | 2 | 38.7 | 5.2 | 4.0 | 5.2 | 1.4 | .5 | 1.2 | .9 | | | | | .9 |

*Appendix Table 2 (continued).*

Soil: **Miami sandy loam (Michigan)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | |
| 1 | 1 | 13.4 | 4.7 | 3.0 | 2.9 | 1.9 | 2.2 | 1.9 | 1.1 | 1.8 | 1.6 | | | | 1.7 |
| 1 | 2 | 14.7 | 5.1 | 4.5 | 2.8 | 2.4 | 2.1 | 2.4 | 2.6 | 2.2 | 2.1 | 2.3 | | | 2.2 |
| 2 | 1 | 16.2 | 4.7 | 13.0 | 3.9 | 3.4 | 2.6 | 2.0 | 1.4 | 1.2 | .5 | .7 | | | .6 |
| 2 | 2 | 14.5 | 4.6 | 12.0 | 3.0 | 1.8 | 1.3 | 1.4 | 1.2 | .6 | .8 | | | | .7 |
| 3 | 1 | 11.7 | 4.6 | 8.0 | 3.2 | 2.5 | 1.5 | 1.7 | 1.1 | 1.6 | 1.6 | | | | 1.6 |
| 3 | 2 | 13.4 | | | | | | | | | | | | | |
| Wet run (June, 1961) | | | | | | | | | | | | | | | |
| 1 | 1 | 16.0 | 4.7 | 2.0 | 1.7 | .6 | 1.2 | 1.2 | .9 | .8 | | | | | .9 |
| 1 | 2 | 16.6 | 4.7 | 7.0 | 2.6 | 1.1 | 1.2 | 1.4 | .5 | .4 | .6 | | | | .5 |
| 2 | 1 | 18.8 | 5.2 | 1.0 | 3.9 | 2.6 | 2.5 | 2.6 | 2.7 | 2.5 | 2.9 | 2.2 | | | 2.6 |
| 2 | 2 | 20.3 | 4.6 | 6.0 | 2.4 | 1.3 | 1.2 | 1.3 | .7 | .5 | .5 | | | | .5 |
| 3 | 1 | 21.1 | 5.6 | 4.0 | 4.6 | 3.7 | 2.6 | 2.9 | 2.8 | 2.4 | 2.1 | 1.8 | 2.0 | 2.0 | 2.0 |
| 3 | 2 | 20.2 | | | | | | | | | | | | | 1.3[a] |

[a]Calculated missing value.

Soil: **Minto silt loam (Alaska)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (1964) | | | | | | | | | | | | | |
| 1 | 1 | 23.3 | 4.2 | 2.8 | 1.6 | .8 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 1 | 2 | 23.3 | 4.0 | 3.0 | | .4 | .4 | .4 | .4 | .4 | .4 | | .4 |
| 2 | 1 | 25.0 | 4.1 | 1.5 | 1.9 | .6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 2 | 2 | 25.0 | 4.1 | 2.0 | 1.4 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 3 | 1 | 29.8 | 4.1 | 2.5 | .6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 3 | 2 | 29.8 | 4.0 | 2.0 | 2.1 | .8 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| Wet run (1964) | | | | | | | | | | | | | |
| 1 | 1 | 31.1 | 4.1 | 3.5 | 2.6 | .7 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 1 | 2 | 31.1 | 4.1 | 3.0 | 2.4 | .6 | .5 | .5 | .5 | .5 | | | .5 |
| 2 | 1 | 30.8 | 4.0 | 1.5 | 1.0 | .3 | .3 | .3 | .3 | .3 | | | .3 |
| 2 | 2 | 31.3 | 4.0 | 1.5 | 1.3 | .4 | .4 | .4 | .4 | .4 | | | .4 |
| 3 | 1 | 28.2 | 4.0 | 2.0 | 1.0 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 |
| 3 | 2 | 30.4 | 3.9 | 2.5 | 2.2 | .4 | .4 | .4 | .4 | .4 | | | .4 |

*Appendix Table 2 (continued).*

Soil: **Moody silt loam (Iowa)** Crop stage: Clipped

| Identification Rep. | Identification Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5. min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate[a] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July-August, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 16.8 | 4.7 | 2.5 | 4.6 | 2.5 | 1.6 | 1.4 | 1.6 | 1.4 | 1.4 | 1.3 | 1.3 | 1.4 | 1.0 | | | | 1.3 |
| 1 | 2 | 23.2 | 4.6 | 3.5 | 4.6 | 2.7 | 1.3 | 1.6 | 1.1 | 1.1 | 1.5 | 1.3 | 1.3 | 1.7 | 1.3 | | | | 1.3 |
| 2 | 1 | 21.6 | 4.6 | 3.5 | 4.6 | 3.5 | 2.4 | 1.9 | 1.9 | 1.3 | 1.1 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | | | 1.3 |
| 2 | 2 | 21.2 | 4.6 | 3.0 | 4.6 | 3.9 | 2.5 | 1.9 | 1.7 | 1.1 | 1.6 | 1.1 | 1.3 | 1.3 | 1.1 | 1.1 | | | 1.1 |
| 3 | 1 | 24.2 | 4.1 | 7.5 | 4.1 | 4.0 | 1.2 | 1.2 | 1.2 | .7 | 1.0 | .8 | .6 | 1.0 | .4 | .7 | 1.0 | .7 | .7 |
| 3 | 2 | 25.5 | 4.2 | 4.0 | 4.2 | 3.4 | 2.6 | 1.9 | 1.6 | 1.9 | 1.5 | 1.5 | 1.6 | 1.5 | .9 | 2.0 | | | 1.5 |
| Wet run (July-August, 1962) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 30.3 | 4.4 | 1.5 | 4.3 | 1.9 | 1.8 | 1.7 | 1.4 | 1.5 | 1.7 | 1.7 | 1.3 | 1.4 | 1.7 | 1.7 | | | 1.3 |
| 1 | 2 | 33.4 | 4.2 | 3.0 | 4.2 | 2.8 | 2.0 | 1.7 | 1.3 | 1.5 | 1.5 | 1.7 | 1.5 | 1.3 | | | | | 1.2 |
| 2 | 1 | 30.6 | 4.4 | 5.5 | 4.4 | 4.0 | 3.2 | 2.9 | 2.9 | 2.8 | 2.9 | 2.8 | 2.9 | 2.8 | 2.8 | 2.8 | | | 2.7 |
| 2 | 2 | 31.8 | 4.6 | 4.5 | 4.6 | 3.8 | 2.1 | 2.3 | 2.0 | 2.0 | 1.7 | 1.7 | 1.5 | 1.3 | 1.9 | | | | 1.4 |
| 3 | 1 | 32.8 | 4.7 | 5.5 | 4.7 | 3.3 | 1.4 | 1.2 | 1.2 | 1.2 | .9 | .9 | 1.2 | .7 | .6 | | | | .5 |
| 3 | 2 | 32.8 | 4.1 | 6.0 | 4.1 | 3.8 | 2.3 | 1.6 | 1.8 | 1.5 | 1.4 | 1.6 | 1.4 | 1.4 | 1.4 | 1.4 | 1.6 | | 1.2 |

[a]Wet-run equilibrium values calculated by applying field data to Phillip's (8) equation.

Soil: **Morton loam (North Dakota)** Crop stage: Crested wheatgrass, clipped (2 inches)

| Identification Rep. | Identification Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Min. to initial runoff | Mean rate, in./hr. 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 32.5 min. | 37.5 min. | 42.5 min. | 47.5 min. | 52.5 min. | 57.5 min. | 67.5 min. | 77.5 min. | 87.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1962) | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 19.3 | 4.4 | 8 | 4.4 | 4.4 | 2.7 | 2.2 | 2.2 | 2.0 | 2.0 | 1.9 | | 1.8 | | 1.8 | 1.7 | 1.7 | 1.7 | |
| 1 | 2 | | 4.4 | 3 | 4.4 | 1.9 | 1.5 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | | 1.2 | | 1.2 | 1.2 | 1.2 | 1.2 | |
| 2 | 1 | | 4.5 | 10 | 4.5 | 4.5 | 3.8 | 2.9 | 2.6 | 2.5 | 2.4 | 2.4 | | 2.2 | | 2.1 | 2.1 | 2.0 | 2.0 | |
| 2 | 2 | | 4.9 | 3 | 4.9 | 2.8 | 2.4 | 2.1 | 1.9 | 1.8 | 1.7 | 1.6 | | 1.5 | | 1.5 | 1.4 | 1.4 | 1.4 | |
| 3 | 1 | | 4.6 | 4 | 4.6 | 2.0 | 1.6 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | | 1.4 | | 1.4 | 1.4 | | | |
| 3 | 2 | | 4.7 | 5 | 4.7 | 2.2 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.5 | | 1.5 | | 1.4 | 1.4 | 1.4 | 1.4 | |
| Wet run (June, 1962) | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 27.0 | 4.5 | 3 | 4.5 | 1.2 | .7 | .6 | .6 | .7 | .7 | .7 | .7 | .7 | .7 | | | | | .7 |
| 1 | 2 | | 4.9 | 3 | 4.9 | 1.3 | .9 | .9 | .9 | .9 | .9 | .9 | | | | | | | | .1 |
| 2 | 1 | | 4.8 | 5 | 4.8 | 2.8 | 1.7 | 1.4 | 1.4 | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 | | | | | | 1.5 |
| 2 | 2 | | 5.0 | 2 | 3.6 | 1.7 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | | | | | | | | 1.4 |
| 3 | 1 | | 4.5 | 3 | 4.5 | 1.1 | .6 | .6 | .5 | .5 | .5 | .5 | .5 | .6 | .6 | .6 | | | | .5 |
| 3 | 2 | | 4.9 | 2 | 2.8 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | | 1.0 | | | | 1.0 |

*Appendix Table 2 (continued).*

Soil: **Plainfield loamy sand (Wisconsin)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 15 min. | 30 min. | 45 min. | 60 min. | 75 min. | 90 min. | 105 min. | 120 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | |
| 1 | 1 | | 4.4 | 7 | 4.3 | 4.3 | 4.3 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| 1 | 2 | | 5.2 | 3 | 4.3 | 4.3 | 4.6 | 4.9 | 5.0 | 5.0 | 5.1 | 5.2 | 5.1 |
| 2 | 1 | | 2.7 | 7 | 2.6 | 2.6 | 2.6 | 2.5 | 2.6 | 2.6 | 2.5 | 2.6 | 2.5 |
| 2 | 2 | | 4.8 | 5 | 4.6 | 4.5 | 4.6 | 4.8 | 4.6 | 4.6 | 4.6 | 4.8 | 4.6 |
| Wet run | | | | | | | | | | | | | |
| 1 | 1 | | 4.1 | 5 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| 1 | 2 | | 4.8 | 10 | 4.6 | 3.8 | 4.0 | 4.0 | 4.2 | 4.3 | 4.4 | 4.5 | 4.4 |
| 2 | 1 | | 4.5 | 5 | 4.4 | 4.4 | 4.4 | 4.8 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 |
| 2 | 2 | | 4.7 | 5 | 4.7 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 | 4.6 |

Soil: **Port Byron silt loam (Minnesota)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 30 min. | 40 min. | 50 min. | 60 min. | 70 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1963) | | | | | | | | | | | | |
| 1 | 1 | 18.5 | 4.4 | 10 | | 3.4 | 3.3 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| 1 | 2 | | 4.3 | 11 | | 3.2 | 2.8 | 2.8 | 2.6 | 2.6 | 2.6 | 2.6 |
| 2 | 1 | 16.5 | 4.2 | 6 | 3.0 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | | 1.8 |
| 2 | 2 | | 4.1 | 4 | 3.4 | 2.8 | 2.5 | 2.2 | 2.2 | 2.2 | | 2.2 |
| 3 | 1 | 14.0 | 4.1 | 18 | | 3.8 | 3.1 | 2.7 | 2.6 | 2.6 | | 2.6 |
| 3 | 2 | | 4.1 | 15 | | 3.4 | 2.9 | 2.6 | 2.5 | 2.4 | | 2.4 |
| Wet run (July, 1963) | | | | | | | | | | | | |
| 1 | 1 | 33.6 | 4.4 | 10 | | 2.7 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 |
| 1 | 2 | | 4.2 | 9 | | 2.9 | 2.8 | 2.6 | 2.6 | 2.6 | 2.5 | 2.5 |
| 2 | 1 | 29.4 | 4.1 | 5 | 2.1 | 1.7 | 1.6 | 1.6 | 1.5 | | | 1.5 |
| 2 | 2 | | 3.8 | 6 | 1.8 | 1.3 | 1.4 | 1.4 | 1.4 | | | 1.4 |
| 3 | 1 | 29.8 | 4.2 | 8 | 3.0 | 2.0 | 1.9 | 1.8 | 1.8 | | | 1.8 |
| 3 | 2 | | 4.2 | 10 | | 2.6 | 2.4 | 2.3 | 2.2 | 2.2 | | 2.2 |

*Appendix Table 2 (continued).*

Soil: **Russell silt loam (Indiana)** Crop stage: Clipped (first-year sod)

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1961) | | | | | | | | | | | | | | | | |
| 1 | 1 | 16.8 | 3.8 | 4.0 | 3.8 | 1.4 | .5 | .4 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 |
| 1 | 2 | 16.5 | 3.2 | 4.0 | 3.2 | 1.1 | .6 | .6 | .6 | .6 | .6 | .5 | .4 | .4 | .4 | .4 |
| 2 | 1 | 22.4 | 3.5 | 3.0 | 3.5 | 1.6 | .9 | .7 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 2 | 22.7 | 4.0 | 3.0 | 4.0 | 1.9 | 1.3 | .9 | .7 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 3 | 1 | 18.1 | 3.1 | 4.0 | 3.1 | .8 | .5 | .5 | .5 | .6 | .5 | .6 | .5 | .5 | .5 | .5 |
| 3 | 2 | 14.9 | 3.1 | 4.0 | 3.1 | 1.9 | .8 | .7 | .6 | .6 | .6 | .5 | .5 | .5 | .5 | .5 |
| Wet run (July, 1961) | | | | | | | | | | | | | | | | |
| 1 | 1 | 21.6 | 3.4 | 2.0 | 3.4 | 1.3 | .6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 1 | 2 | 18.7 | 3.4 | 2.5 | 3.4 | 2.5 | .8 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 | .7 |
| 2 | 1 | 22.1 | 3.0 | 2.0 | 3.0 | .5 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 | .4 |
| 2 | 2 | 24.1 | 3.4 | 3.0 | 3.4 | 1.1 | .5 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 | .3 |
| 3 | 1 | 24.7 | 2.6 | 2.5 | 2.6 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 3 | 2 | 22.6 | 3.0 | 2.0 | 3.0 | .9 | .5 | .4 | .3 | .4 | .4 | .4 | .4 | .4 | .4 | .4 |

Soil: **Sharpsburg silty clay loam (Nebraska)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. To 10 min. | 15 or to 20 min. | 25 min. | 35 min. | 45 min. | 55 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (May-June, 1963) | | | | | | | | | | | |
| 1 | | 19.6 | 5.0 | 8 | 4.8 | 3.3 | 2.8 | 3.0 | 3.5 | 3.5 | 2.9 |
| 2 | | 19.4 | 4.7 | 10 | | 2.0 | 1.4 | 1.4 | .9 | 1.2 | .9 |
| 3 | | 9.1 | 5.3 | 10 | | 4.6 | 4.6 | 2.1 | 1.7 | 2.0 | 1.8 |
| 4 | | 9.1 | 4.9 | 9 | 4.7 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 | 4.8 |
| Wet run (May-June, 1963) | | | | | | | | | | | |
| 1 | | FC | 4.9 | 6 | 4.1 | 1.8 | 2.2 | 1.7 | 1.9 | 2.6 | 1.8 |
| 2 | | FC | 4.9 | 7 | 4.5 | 1.2 | .8 | 1.1 | .8 | 1.0 | 1.0 |
| 3 | | FC | 5.1 | 5 | | 2.3 | 1.9 | 2.0 | 2.0 | 1.7 | 1.7 |
| 4 | | FC | 4.6 | 8 | 4.0 | 1.8 | 1.4 | 1.1 | 1.6 | .9 | .9 |

FC = field capacity

*Appendix Table 2 (continued).*

Soil: **Sims loam (Michigan)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1961) | | | | | | | | | | | | | | | | |
| 1 | 1 | 31.0 | 5.0 | 5.0 | 4.7 | 3.6 | 2.6 | 2.5 | 2.8 | 2.4 | 2.5 | 2.6 | | | | 2.5 |
| 1 | 2 | 21.0 | 5.3 | 3.0 | 4.3 | 3.2 | 3.0 | 2.9 | 3.1 | 2.9 | 3.1 | 3.0 | 2.8 | | | 3.0 |
| 2 | 1 | 26.8 | 4.6 | 4.0 | 3.8 | 2.1 | 1.5 | 1.4 | 1.2 | 1.6 | 1.9 | | | | | 1.4 |
| 2 | 2 | 22.0 | 5.2 | 7.0 | 3.9 | 2.8 | 2.9 | 3.1 | 3.0 | 3.1 | 3.1 | 3.1 | | | | 3.1 |
| 3 | 1 | 24.8 | 4.7 | 8.0 | 2.9 | 1.9 | 1.6 | 1.7 | 2.1 | 1.6 | 1.7 | | | | | 1.7 |
| 3 | 2 | 20.4 | 5.3 | 8.0 | 4.7 | 4.4 | 3.8 | 3.6 | 3.3 | 3.4 | 3.4 | 3.0 | 3.6 | 3.4 | 3.1 | 3.4 |
| Wet run (August, 1961) | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.0 | 5.0 | 2.0 | 4.2 | 3.2 | 2.6 | 2.4 | 2.4 | 2.0 | 2.2 | | | | | 2.2 |
| 1 | 2 | 29.3 | 5.3 | 5.0 | 4.6 | 3.8 | 4.0 | 2.9 | 4.1 | 3.5 | 3.2 | 3.2 | 3.3 | 3.3 | 3.0 | 3.3 |
| 2 | 1 | 26.0 | 5.1 | 3.0 | 3.4 | 2.1 | 2.2 | 2.4 | 1.7 | 1.9 | 2.3 | | | | | 2.1 |
| 2 | 2 | 20.7 | 5.2 | 4.0 | 4.4 | 2.8 | 2.4 | 3.1 | 3.1 | 2.7 | 2.5 | 2.6 | | | | 2.6 |
| 3 | 1 | 25.4 | 4.7 | 5 | 4.3 | 4.5 | 2.7 | 2.1 | 1.8 | 2.1 | 2.3 | 1.7 | 1.6 | | | 2.0 |
| 3 | 2 | 22.3 | 5.3 | | 3.3 | 3.1 | 2.8 | 2.9 | 2.8 | 2.7 | 2.9 | | | | | 2.8 |

Soil: **Sinai silty clay loam (South Dakota)** Crop stage: Clipped, 3 inches high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 3 min. | 8 min. | 13 min. | 18 min. | 23 min. | 28 min. | 33 min. | 38 min. | 43 min. | 48 min. | 53 min. | 58 min. | 63 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1963) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 42.1 | 4.7 | 7.2 | 4.7 | 4.0 | 3.3 | 2.5 | 2.5 | 2.5 | 2.0 | 2.4 | 2.4 | 2.3 | | | | |
| 1 | 2 | 42.1 | 4.0 | 28.8 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.4 | 2.7 | 2.2 | 2.1 | 1.7 | 1.5 | 1.7 | |
| 2 | 1 | 42.1 | 4.3 | 15.2 | 4.3 | 4.3 | 4.3 | 4.3 | 3.8 | 3.4 | 2.9 | 2.6 | 2.2 | 1.9 | 2.2 | 1.5 | 1.9 | |
| 2 | 2 | 42.1 | 4.0 | 14.5 | 4.0 | 4.0 | 4.0 | 3.5 | 3.1 | 2.1 | 2.0 | 1.3 | 1.6 | 1.7 | 1.7 | 1.1 | | |
| 3 | 1 | 42.1 | 3.4 | 29.0 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 | 3.1 | 2.4 | 2.1 | 1.6 | 1.5 | .8 | .7 | |
| 3 | 2 | 42.1 | 4.0 | 21.0 | 4.0 | 4.0 | 4.0 | 4.0 | 3.9 | 3.8 | 3.7 | 3.6 | 3.5 | 2.7 | 2.7 | 2.7 | 2.4 | |
| Wet run (July, 1963) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 41.4 | 4.5 | 6.5 | 4.5 | 3.5 | 1.3 | 1.9 | 1.3 | 1.2 | 1.8 | 1.5 | | | | | | 1.5 |
| 1 | 2 | 37.6 | 4.2 | 8.0 | 4.2 | 2.8 | .9 | 1.2 | .9 | 1.3 | .6 | .9 | | | | | | 1.0 |
| 2 | 1 | 42.8 | 4.0 | 7.5 | 4.0 | 2.7 | 1.1 | 1.4 | 1.1 | 1.1 | .8 | .9 | | | | | | 1.0 |
| 2 | 2 | 40.3 | 4.4 | 7.0 | 4.4 | 3.2 | 1.5 | 1.7 | 1.3 | 1.1 | 1.4 | 1.6 | | | | | | 1.3 |
| 3 | 1 | 40.4 | 4.0 | 14.2 | 4.0 | 4.0 | 4.0 | 2.6 | 1.9 | 1.9 | .9 | .9 | 1.3 | 1.2 | 1.1 | | | 1.1 |
| 3 | 2 | 54.0 | 3.8 | 7.2 | 3.8 | 3.8 | 1.9 | 1.2 | 1.0 | 1.0 | .8 | .3 | 1.0 | | | | | .6 |

*Appendix Table 2 (continued).*

Soil: **Webster clay loam (Minnesota)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 30 min. | 40 min. | 50 min. | 60 min. | 70 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1964) | | | | | | | | | | | | |
| 1 | 1 | 13.4 | 4.9 | 9 | 4.2 | 1.7 | 1.4 | 1.4 | 1.4 | 1.4 | | 1.4 |
| 1 | 2 | | 4.9 | 10 | | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | | 2.0 |
| 2 | 1 | 10.6 | 4.8 | 12 | | 2.4 | 1.6 | 1.6 | 1.6 | 1.6 | | 1.6 |
| 2 | 2 | | 4.4 | 10 | | 3.2 | 3.1 | 2.8 | 2.4 | 2.1 | 2.1 | 2.1 |
| 3 | 1 | 11.4 | 5.3 | 5 | 3.0 | 2.1 | 2.0 | 2.0 | 2.0 | | | 2.0 |
| 3 | 2 | | 4.9 | 2 | 1.0 | .5 | .8 | 1.0 | 1.0 | | | 1.0 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 23.5 | 4.6 | 2 | 1.7 | .8 | .7 | .7 | .7 | .7 | | .7 |
| 1 | 2 | | 4.4 | 4 | 1.5 | .5 | .4 | .4 | .4 | .4 | | .4 |
| 2 | 1 | 22.1 | 4.6 | 6 | 2.8 | .7 | .6 | .5 | .5 | .5 | | .5 |
| 2 | 2 | | 4.9 | 2 | 1.8 | 1.0 | 1.0 | 1.0 | | | | 1.0 |
| 3 | 1 | 23.6 | 4.6 | 2 | .7 | .8 | | .4 | .4 | | | .4 |
| 3 | 2 | | 4.9 | 2 | 1.2 | .8 | | .7 | .6 | .6 | | .6 |

Soil: **Withee silt loam (Wisconsin)** Crop stage: Clipped

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 15 min. | 30 min. | 45 min. | 60 min. | 75 min. | 90 min. | 105 min. | 120 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1963) | | | | | | | | | | | | | |
| 1 | 1 | 7.6 | 5.7 | 6 | 5.0 | 3.9 | 3.6 | 3.6 | 3.5 | 3.6 | 3.6 | 2.1 | 2.1 |
| 1 | 2 | | 4.4 | 4 | 3.7 | 3.9 | 2.7 | 2.1 | 1.8 | 1.4 | 1.3 | 1.4 | 1.4 |
| 2 | 1 | | 4.4 | 27 | 4.4 | 4.4 | 3.9 | 3.3 | 2.6 | 2.2 | 2.0 | 2.4 | 2.8 |
| 2 | 2 | | 4.2 | 11 | 4.1 | 3.0 | 2.4 | 2.0 | 1.2 | 1.3 | 1.1 | 1.2 | 1.1 |
| 3 | 1 | | 4.4 | 5 | 3.4 | 3.0 | 2.6 | 2.0 | 2.0 | 2.0 | 1.2 | 1.8 | 1.5 |
| 3 | 2 | | 4.8 | 4 | 3.1 | 2.2 | 1.7 | 1.6 | 1.0 | | | | 1.0 |
| Wet run (August, 1963) | | | | | | | | | | | | | |
| 1 | 1 | 13.0 | 4.8 | 10 | 4.6 | 2.7 | 2.0 | 1.3 | 1.8 | 1.3 | | | 1.3 |
| 1 | 2 | | 4.5 | 8 | 4.0 | 1.5 | 1.1 | .6 | 1.1 | 1.1 | | | 1.1 |
| 2 | 1 | | 4.9 | 16 | 4.9 | 2.6 | 1.6 | 1.7 | 2.2 | 1.4 | | | 1.4 |
| 2 | 2 | | 4.6 | 8 | 3.9 | 1.9 | 1.4 | 1.3 | .9 | | | | .9 |
| 3 | 1 | | 3.9 | 6 | 2.8 | 1.4 | 1.3 | 1.2 | .8 | .7 | | | .7 |
| 3 | 2 | | 4.9 | 4 | 3.5 | 1.6 | 1.3 | 1.1 | 1.0 | | | | 1.0 |

*Appendix Table 3. Moisture Infiltration Rates on Soils With Corn After Cultivation Treatment*

Soil: **Blount silty clay loam (Ohio)** Crop stage: Corn plants up on plot but no pass with machinery

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 23.1 | 4.2 | 4.5 | 4.6 | (4.8)4.4 | 4.3 | 3.7 | 3.3 | 3.3 | 2.8 | 1.4 | 1.2 | 1.0 | 1.2 | .5 | .1 | .5 |
| 1 | 2 | 24.4 | 3.9 | 9.0 | 4.2 | 4.2 | (9.5)4.1 | 3.8 | 3.2 | 3.2 | 3.1 | 2.1 | 2.4 | 1.8 | .9 | 1.0 | 1.0 | 1.0 |
| 2 | 1 | 24.3 | 4.1 | 8.5 | 4.0 | 4.0 | (9.3)3.9 | 4.1 | 3.0 | 2.2 | 2.2 | 1.4 | 1.1 | 1.1 | .7 | .6 | .9 | .7 |
| 2 | 2 | 18.6 | 4.7 | 13.2 | 4.7 | 4.7 | 4.7 | (14.1)2.4 | 2.6 | 2.4 | 1.9 | 1.3 | 1.3 | 1.0 | .4 | .6 | .7 | .5 |
| 3 | 1 | 17.3 | 4.1 | 5.0 | 4.0 | 4.0 | 3.1 | 1.2 | 1.1 | .7 | .3 | .6 | .3 | .2 | .2 | .1 | .3 | .1 |
| 3 | 2 | 19.4 | 4.6 | 4.0 | 4.7 | (4.5)4.6 | 3.4 | 1.3 | 1.1 | .4 | .3 | .5 | .6 | .4 | .2 | .3 | .4 | .2 |
| Wet run (July, 1965) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 34.3 | 4.7 | 1.5 | 4.8 | (3.3)1.1 | 1.0 | .2 | | | .8 | .4 | .1 | | | .5 | | .2 |
| 1 | 2 | 34.7 | 4.8 | 1.2 | 4.9 | (3.1)3.4 | .9 | .1 | .9 | .6 | .8 | 1.2 | .2 | .5 | .4 | .7 | .2 | .3 |
| 2 | 1 | 41.3 | 3.9 | 1.5 | 3.9 | | 1.7 | .5 | | | | .4 | | .2 | .3 | .1 | .1 | .1 |
| 2 | 2 | 33.4 | 4.5 | 2.5 | 4.7 | (3.7)2.1 | 1.7 | .7 | .2 | .8 | .6 | .7 | .7 | .3 | | .9 | 1.0 | .4 |
| 3 | 1 | 26.7 | 4.4 | 1.0 | 4.6 | (3.0)2.2 | .6 | .3 | .5 | 0 | .6 | .2 | .2 | .4 | .3 | .2 | .3 | .1 |
| 3 | 2 | 25.8 | 4.4 | 1.0 | 4.4 | (3.0)3.6 | .7 | .1 | .4 | | .3 | .4 | .1 | | .1 | .4 | .4 | .1 |

Soil: **Canfield silt loam (Ohio)** Crop stage: Cultivated corn

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1964) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 22.2 | 4.3 | 2.0 | 4.6 | (3.5)3.7 | 1.8 | .8 | .6 | .5 | .1 | .8 | | .3 | .2 | .3 | .1 | .1 |
| 1 | 2 | 16.2 | 5.4 | 2.5 | 5.5 | (3.8)2.6 | 2.6 | 1.4 | 1.3 | 1.3 | 1.3 | 1.5 | 1.4 | 1.7 | 1.2 | 1.6 | .8 | 1.0 |
| 2 | 1 | 17.0 | 5.6 | 5.2 | 6.3 | 6.3 | (7.6)3.8 | 1.4 | 2.2 | | 2.2 | 1.4 | .5 | .7 | .7 | 1.0 | .5 | .6 |
| 2 | 2 | 25.8 | 6.0 | 2.0 | 6.0 | (3.5)1.4 | 1.6 | .7 | .9 | 1.1 | .7 | 1.2 | .9 | .6 | 1.4 | .6 | .6 | .6 |
| 3 | 1 | 16.9 | 3.8 | 4.5 | 3.8 | (4.9)2.2 | .9 | .5 | .3 | .6 | .4 | .4 | .4 | .3 | .4 | .5 | .4 | .3 |
| 3 | 2 | 17.1 | 4.6 | 3.5 | 4.5 | (4.3)3.6 | 1.9 | .7 | .6 | .6 | .6 | .9 | .6 | .6 | .6 | 1.2 | .3 | .4 |
| Wet run (August, 1964) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 27.3 | 4.3 | 1.5 | 3.1 | (3.3)2.2 | 2.0 | 1.8 | .8 | .5 | 0 | .6 | .5 | .1 | .4 | | .2 | .1 |
| 1 | 2 | 26.5 | 4.5 | 1.5 | 4.8 | (3.3)2.2 | .6 | .2 | .3 | .3 | .2 | .2 | .4 | .2 | .1 | .2 | .1 | .1 |
| 2 | 1 | 28.6 | 4.6 | 2.2 | 4.7 | (3.6)1.8 | 1.2 | .7 | .3 | .5 | .8 | .5 | .8 | 1.1 | .2 | .8 | .3 | .4 |
| 2 | 2 | 30.1 | 6.0 | 1.0 | 6.2 | (3.0)1.6 | .8 | .6 | 1.0 | 1.0 | .1 | .7 | .4 | .2 | .9 | 0 | .8 | .2 |
| 3 | 1 | 27.0 | 4.5 | 3.0 | 4.4 | (4.0)2.4 | 1.3 | .9 | 1.0 | .6 | .7 | .9 | .7 | 1.0 | 1.0 | .9 | .7 | .6 |
| 3 | 2 | 28.1 | 5.0 | 2.0 | 5.4 | (3.5)3.0 | 1.8 | .8 | .9 | .9 | .9 | .9 | 1.1 | 1.0 | 1.1 | | | .6 |

*Appendix Table 3 (continued).*

Soil: **Cincinnati silt loam (Indiana)** Crop stage: First cultivation

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 17.0 | 4.6 | 9.0 | 4.6 | 4.6 | 4.5 | 4.1 | 3.8 | 3.5 | 3.2 | 2.9 | 2.7 | 2.5 | 2.4 | 2.2 | 2.0 | |
| 1 | 2 | 15.8 | 4.6 | 7.5 | 4.6 | 4.6 | 4.1 | 3.5 | 2.9 | 2.5 | 2.2 | 2.0 | 1.8 | 1.6 | 1.4 | 1.4 | 1.4 | |
| 2 | 1 | 19.8 | 5.2 | 9.0 | 5.2 | 5.2 | 4.9 | 4.5 | 3.9 | 3.3 | 2.8 | 2.3 | 2.0 | 1.7 | 1.5 | 1.4 | 1.4 | |
| 2 | 2 | 17.0 | 5.2 | 11.0 | 5.2 | 5.2 | 5.2 | 4.8 | 4.3 | 3.8 | 3.4 | 2.8 | 2.4 | 1.9 | 1.4 | 1.1 | 1.1 | |
| 3 | 1 | 15.0 | 5.2 | 8.5 | 5.2 | 5.2 | 4.9 | 4.2 | 3.6 | 3.0 | 2.6 | 2.2 | 1.9 | 1.6 | 1.3 | 1.2 | 1.2 | |
| 3 | 2 | 15.0 | 5.2 | 5.5 | 5.2 | 5.2 | 4.6 | 4.0 | 3.4 | 2.9 | 2.5 | 2.1 | 1.8 | 1.6 | 1.4 | 1.4 | 1.4 | |
| Wet run (July, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 34.3 | 4.9 | 2.0 | 4.9 | 2.5 | 1.8 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| 1 | 2 | 29.8 | 4.9 | 2.0 | 4.9 | 2.4 | 1.6 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| 2 | 1 | 33.8 | 5.2 | 2.5 | 5.2 | 3.0 | 2.6 | 1.2 | .9 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 2 | 30.6 | 5.2 | 2.5 | 5.2 | 3.5 | 2.4 | 1.5 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 3 | 1 | 33.6 | 5.2 | 3.5 | 5.2 | 3.0 | 2.2 | 1.8 | 1.4 | 1.3 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| 3 | 2 | 30.6 | 5.2 | 3.0 | 5.2 | 2.6 | 2.0 | 1.8 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |

Soil: **Cisne silt loam (Illinois)** Crop stage: After first cultivation

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1963) | | | | | | | | | | | | | | | | |
| 1 | | 9.6 | 4.5 | 12 | 3.8 | 3.5 | 2.3 | 1.7 | 1.8 | 1.7 | 1.6 | 1.5 | 1.5 | 1.4 | 1.4 | 1.4 |
| 2 | | 9.0 | 3.9 | 13 | 2.6 | 2.3 | 1.8 | 1.3 | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.1 | 1.0 |
| 3 | | 11.1 | 4.1 | 11 | 3.5 | 3.2 | 1.5 | 1.3 | 1.0 | .8 | .8 | .7 | .8 | .8 | .9 | .8 |
| Wet run (July, 1963) | | | | | | | | | | | | | | | | |
| 1 | | 24.6 | 4.1 | 3 | 2.3 | 1.6 | .6 | .7 | .5 | .6 | .5 | | | | | .5 |
| 2 | | 24.1 | 3.8 | 3 | 1.0 | .6 | .4 | .4 | .4 | .5 | .9 | | | | | .6 |
| 3 | | 20.4 | 4.2 | 3 | 1.1 | .5 | .4 | .4 | .5 | .4 | .4 | .4 | .5 | | | .4 |

*Appendix Table 3 (continued).*

Soil: **Clermont silt loam (Indiana)** Crop stage: First cultivation

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 18.0 | 4.6 | 11.0 | 4.6 | 4.6 | 4.6 | 2.9 | 2.0 | 1.6 | 1.4 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 | |
| 1 | 2 | 18.1 | 4.6 | 9.0 | 4.6 | 4.6 | 3.4 | 2.3 | 1.8 | 1.6 | 1.5 | 1.4 | 1.2 | 1.2 | 1.2 | 1.2 | |
| 2 | 1 | 16.7 | 4.6 | 7.0 | 4.6 | 4.6 | 3.1 | 2.2 | 1.8 | 1.6 | 1.4 | 1.3 | 1.1 | 1.1 | 1.1 | | |
| 2 | 2 | 17.2 | 4.6 | 7.0 | 4.6 | 4.6 | 2.8 | 2.0 | 1.7 | 1.6 | 1.4 | 1.3 | 1.2 | 1.2 | 1.2 | | |
| 3 | 1 | 15.8 | 4.7 | 8.0 | 4.7 | 4.7 | 3.7 | 2.4 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | | |
| 3 | 2 | 18.6 | 4.8 | 8.5 | 4.8 | 4.8 | 4.3 | 3.3 | 2.5 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | | |
| Wet run (July, 1961) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 26.3 | 4.6 | 3.0 | 4.6 | 3.2 | 2.0 | 1.6 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | | 1.2 |
| 1 | 2 | 26.3 | 4.6 | 2.0 | 4.6 | 3.1 | 1.7 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | | 1.2 |
| 2 | 1 | 23.7 | 4.6 | 2.0 | 4.6 | 3.2 | 2.4 | 2.0 | 1.8 | 1.6 | 1.4 | 1.2 | 1.1 | 1.1 | 1.1 | | 1.1 |
| 2 | 2 | 25.2 | 5.2 | 1.0 | 5.0 | 3.3 | 2.3 | 1.8 | 1.5 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | 1.1 |
| 3 | 1 | 23.5 | 4.4 | 2.0 | 4.4 | 2.1 | 1.3 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | | | .6 |
| 3 | 2 | 25.6 | 4.1 | 2.0 | 4.1 | 2.3 | 1.6 | 1.4 | 1.3 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | | | 1.1 |

Soil: **Dudley clay loam (South Dakota)** Crop stage: Cultivated

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 3 min. | 8 min. | 13 min. | 18 min. | 23 min. | 28 min. | 33 min. | 38 min. | 43 min. | 48 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1963) | | | | | | | | | | | | | | | |
| 1 | 1 | 6.7 | 4.5 | 9.5 | 4.5 | 4.5 | 2.9 | 2.2 | 1.9 | 2.0 | 2.0 | 1.5 | 1.0 | .9 | |
| 1 | 2 | 6.7 | 4.5 | 13.8 | 4.5 | 4.5 | 4.0 | 2.6 | 2.8 | 2.0 | 1.5 | 1.4 | 1.0 | 1.3 | |
| 2 | 1 | 6.7 | 4.2 | 13.5 | 4.2 | 4.2 | 3.9 | 2.1 | 1.4 | 1.3 | 1.6 | 1.3 | 1.2 | 1.1 | |
| 2 | 2 | 6.7 | 4.2 | 19.0 | 4.2 | 4.2 | 4.2 | 3.9 | 3.5 | 2.5 | 2.0 | 1.7 | 1.3 | .9 | |
| 3 | 1 | 6.7 | 3.8 | 11.5 | 3.8 | 3.8 | 2.8 | 1.7 | 1.2 | .5 | .5 | .6 | .6 | .7 | |
| 3 | 2 | 6.7 | 3.8 | 11.2 | 3.8 | 3.8 | 2.8 | 1.1 | .6 | .0 | .5 | .2 | .5 | | |
| Wet run (August, 1963) | | | | | | | | | | | | | | | |
| 1 | 1 | 33.8 | 4.1 | 2.0 | 1.3 | .9 | 1.0 | .9 | .5 | .6 | | | | | .5 |
| 1 | 2 | 37.8 | 4.2 | 3.0 | 2.4 | 1.5 | .8 | .9 | .4 | .2 | | | | | .3 |
| 2 | 1 | 35.8 | 4.9 | 4.8 | 4.6 | 2.5 | .7 | .7 | .8 | .4 | | | | | .7 |
| 2 | 2 | 41.9 | 3.6 | 4.0 | 3.0 | .4 | .3 | .1 | .4 | .4 | | | | | .2 |
| 3 | 1 | 33.9 | 4.0 | 3.5 | 2.4 | .2 | .2 | .2 | .3 | .4 | | | | | .3 |
| 3 | 2 | 39.8 | 4.2 | 4.0 | 3.7 | .9 | .7 | .5 | .6 | .6 | | | | | .6 |

*Appendix Table 3 (continued).*

Soil: **Elliott silt loam (Illinois)** Crop stage: Third-year corn, after cultivation

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 18.8 | 5.6 | 5 | 5.3 | 4.9 | 4.2 | 3.5 | 2.9 | 2.5 | 2.2 | 1.8 | 1.5 | 1.2 | 1.2 | 1.6 | 1.2 |
| 1 | 2 | 21.7 | 6.0 | 3 | 5.0 | 4.1 | 3.3 | 2.9 | 2.5 | 2.1 | 1.7 | 1.6 | 1.4[a] | 1.4[a] | 1.4[a] | 1.2 | 1.4 |
| 2 | 1 | 20.2 | 6.0 | 5 | 4.7 | 4.5 | 4.2 | 3.5 | 2.7 | 2.1 | 1.8[a] | 1.7[a] | 1.9[a] | 2.3[a] | 2.1[a] | | |
| 2 | 2 | 21.0 | 6.1 | 7 | 4.9 | 4.5 | 3.8 | 2.9 | 2.3 | 2.3 | 2.4[a] | 2.8[a] | 2.8[a] | 2.8[a] | 2.1[a] | | |
| 3 | 1 | | 6.4 | 4 | 6.0 | 5.5 | 4.9 | 4.1 | 3.0 | 2.6 | 2.2 | 1.7 | 1.4 | 1.3 | 1.4 | | 1.3 |
| 3 | 2 | 22.2 | 6.1 | 6 | 5.3 | 4.8 | 4.3 | 3.5 | 3.2 | 2.7 | 2.1 | 1.5 | 1.2 | 1.0 | .9 | | .8 |
| Wet run (July, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 26.5 | 5.7 | 1 | 3.1 | 1.4 | 1.2 | .9 | .7 | .6 | .4 | | | | | | .4 |
| 1 | 2 | 27.2 | 6.7 | 2 | 2.2 | 1.9 | 1.4 | 1.2 | 1.1 | 1.0 | .9 | 1.3 | 1.3 | 1.5 | 1.6 | | .7 |
| 2 | 1 | 29.9 | 6.1 | 2 | 2.3 | 1.7 | 1.4 | 1.4 | 1.5 | 1.6 | 1.6 | 1.5 | 1.5 | 1.4 | 1.2 | | 1.5 |
| 2 | 2 | 25.8 | 6.2 | 2 | 3.5 | 3.3 | 2.7 | 1.8 | 1.3 | 1.2 | 1.3 | 1.5 | 1.7 | 1.6 | 1.6 | | 1.6 |
| 3 | 1 | 28.0 | 6.6 | 2 | 4.5 | 4.2 | 3.7 | 3.2 | 3.1 | 3.2 | 3.3 | 3.1 | 2.8 | 2.4 | 1.7 | | 1.4 |
| 3 | 2 | | 5.5 | 1 | 3.9 | 2.6 | 2.2 | 2.2 | 2.1 | 2.0 | 1.5 | 1.3 | 1.8 | 1.3 | 1.2 | | 1.0 |

[a]Mechanical failure.

Soil: **Emmet loamy sand (Michigan)** Crop stage: Three-feet high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 8.9 | 5.4 | 5.0 | 4.8 | 3.7 | 3.6 | 3.1 | 3.1 | 3.3 | 3.3 | 3.0 | 3.0 | | | | | 3.0 |
| 1 | 2 | 10.1 | 5.0 | 7.0 | 4.1 | 4.0 | 3.5 | 3.5 | 3.5 | 3.6 | 3.7 | 3.6 | 4.0 | 3.6 | 3.3 | 3.4 | 3.4 | 3.4 |
| 2 | 1 | 9.4 | 4.6 | 5.0 | 2.7 | 2.9 | 2.6 | 2.2 | 2.4 | 2.4 | 2.5 | 2.5 | 2.4 | | | | | 2.5 |
| 2 | 2 | 10.1 | 5.0 | 2.5 | 3.4 | 1.9 | 1.8 | 1.9 | 2.1 | 2.0 | 1.8 | | | | | | | 2.0 |
| 3 | 1 | 10.1 | 5.4 | 1.0 | 5.2 | 4.1 | 3.4 | 2.4 | 3.2 | 2.4 | 2.6 | 2.5 | 2.3 | | | | | 2.5 |
| 3 | 2 | 10.0 | 5.0 | 1.0 | 4.8 | 3.6 | 2.8 | 2.7 | 2.7 | 3.0 | 3.0 | 2.5 | | | | | | 2.7 |
| Wet run (July, 1961) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 12.0 | 5.2 | 2.0 | 2.4 | 1.7 | 1.8 | 1.7 | 1.6 | 1.9 | | | | | | | | 1.8 |
| 1 | 2 | 13.6 | 4.2 | 2.0 | .1 | .9 | .9 | .3 | .3 | | | | | | | | | .3 |
| 2 | 1 | 16.1 | 4.6 | 1.5 | 1.8 | 1.9 | 1.2 | 1.2 | 1.2 | 1.2 | | | | | | | | 1.2 |
| 2 | 2 | 15.3 | 5.0 | 1.0 | 1.5 | .2 | .2 | 1.0 | | | | | | | | | | 1.0 |
| 3 | 1 | 17.5 | 5.4 | 1.0 | .4 | 1.8 | 1.7 | 1.9 | 1.7 | | | | | | | | | 1.8 |
| 3 | 2 | 16.6 | 5.0 | 1.0 | 2.5 | 1.3 | 1.5 | 1.6 | 1.4 | | | | | | | | | 1.5 |

*Appendix Table 3 (continued).*

Soil: **Flanagan silt loam (Illinois)** Crop stage: Third-year corn after cultivation

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2 min. | 5 min. | 10 min. | 15 min. | 20 min. | 25 min. | 30 min. | 35 min. | 40 min. | 45 min. | 50 min. | 60 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1[a] | 23.7 | 4.1 | 13 | 4.0 | 4.0 | 3.8 | 3.8 | 3.7 | 3.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 | 3.6 |
| 1 | 2 | 22.1 | 4.0 | 38 | 3.8 | 3.5 | 3.2 | 3.2 | 3.0 | 2.7 | 2.6 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.2 |
| 2 | 1 | run not acceptable | | | | | | | | | | | | | | | |
| 2 | 2[a] | 26.9 | 4.7 | 4 | 4.5 | 4.4 | 4.4 | 4.3 | 4.3 | 4.3 | 4.2 | 4.2 | 4.0 | 3.4 | 2.7 | 2.8 | 2.7 |
| 3 | 1 | 26.1 | 4.3 | 15 | 4.1 | 3.7 | 3.4 | 3.2 | 2.7 | 2.6 | 2.5 | 2.3 | 2.1 | 1.8 | 1.7 | 1.6 | 1.4 |
| 3 | 2 | 26.1 | 4.3 | 6 | 4.1 | 3.9 | 3.5 | 3.2 | 2.6 | 2.5 | 2.4 | 2.1 | 2.1 | 1.5 | 1.7 | 1.6 | 1.6 |
| Wet run (June, 1964) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 32.1 | 4.4 | 2 | 4.4 | 4.2 | 3.9 | 3.6 | 3.4 | 3.2 | 3.2 | 3.1 | 3.1 | 3.0 | 2.8 | 2.8 | 2.8 |
| 1 | 2 | 32.1 | 4.0 | 7 | 2.1 | 1.6 | 1.5 | 1.3 | 1.2 | 1.2 | 1.1 | 1.0 | 1.0 | 1.0 | .8 | | 1.0 |
| 2 | 1 | 32.6 | 4.8 | 4 | 4.2 | 4.3 | 4.2 | 4.2 | 4.1 | 3.9 | 3.7 | 3.5 | 3.2 | 3.2 | 3.1 | 2.9 | 2.8 |
| 2 | 2 | 23.9 | 4.5 | 3 | 3.6 | 3.0 | 2.3 | 1.8 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.7 | | | 1.5 |
| 3 | 1 | 27.7 | 5.3 | 3 | run not acceptable | | | | | | | | | | | | |
| 3 | 2 | 29.8 | 6.0 | 2 | run not acceptable | | | | | | | | | | | | |

[a]Mechanical failure

Soil: **Hoytville clay (Ohio)** Crop stage: Cultivated

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Min. to initial runoff | Mean rate, in./hr. 0 min. | 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 35.0 min. | 45.0 min. | 55.0 min. | 65.0 min. | 75.0 min. | 85.0 min. | Equil. rate (90 min.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August-September, 1964) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 27.8 | 4.7 | 8.0 | 4.6 | 4.6 | (9.0)4.3 | 3.6 | 3.5 | 2.8 | 2.5 | 2.4 | 1.8 | 2.2 | 1.9 | 1.8 | 1.7 | 1.6 |
| 1 | 2 | 26.6 | 4.3 | 9.0 | 4.3 | 4.3 | (9.5)4.3 | 4.1 | 4.0 | 3.8 | 3.0 | 2.2 | 2.0 | .8 | .3 | .7 | .3 | .5 |
| 2 | 1 | 21.5 | 4.4 | 21.0 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | (23.0)4.1 | 4.0 | 3.4 | 2.8 | 2.2 | 1.6 | 1.8 | 1.6 | 1.5 |
| 2 | 2 | 27.4 | 3.8 | 12.0 | 3.6 | 3.6 | 3.6 | (13.5)3.4 | 3.4 | 2.7 | 2.7 | 2.3 | 2.1 | 1.9 | 1.4 | 1.1 | .4 | .9 |
| 3 | 1 | 23.4 | 3.8 | 6.0 | 3.9 | 3.9 | (8.0)3.7 | 3.5 | 3.2 | 3.0 | 2.8 | 2.3 | 1.2 | .4 | .8 | .1 | .1 | .3 |
| 3 | 2 | 23.5 | 3.8 | 13.0 | 3.8 | 3.8 | 3.8 | (14.0)3.7 | 3.8 | 3.3 | 2.5 | 1.6 | .9 | .9 | 1.0 | | .5 | .6 |
| Wet run (August-September, 1964) | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 37.8 | 4.5 | 2.0 | 4.5 | (3.5)2.3 | 1.6 | 1.0 | .8 | 1.1 | 1.4 | 1.0 | 1.0 | .9 | .7 | .3 | 1.0 | .6 |
| 1 | 2 | 39.2 | 4.4 | 2.0 | 4.5 | (3.5)2.3 | 1.4 | 1.2 | .8 | .3 | 1.0 | .3 | .7 | 1.1 | .4 | .6 | 1.0 | .4 |
| 2 | 1 | 38.6 | 4.0 | 2.5 | 3.9 | (3.7)1.9 | 1.5 | .7 | .4 | .4 | .3 | .6 | .1 | .4 | .3 | .2 | .4 | .2 |
| 2 | 2 | 39.0 | 3.9 | 2.5 | 3.6 | (3.7)2.3 | 1.2 | .9 | .5 | .1 | 0 | .3 | .3 | 0 | .2 | 0 | .5 | .1 |
| 3 | 1 | 37.2 | 4.2 | 1.5 | 4.2 | (3.3)2.8 | 1.1 | .8 | .7 | | .8 | .8 | .5 | .6 | .9 | .3 | .6 | .4 |
| 3 | 2 | 37.7 | 4.3 | 3.0 | 4.2 | (4.0)2.6 | .7 | .6 | .6 | | .6 | .6 | .3 | .3 | .4 | .5 | .4 | .3 |

*Appendix Table 3 (continued).*

Soil: **Kenyon silt loam (Minnesota)** Crop stage: Cultivated, crop removed

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 30 min. | 40 min. | 50 min. | 60 min. | 70 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1963 and 1964) | | | | | | | | | | | | |
| 1 | 1 | 11.5 | 4.0 | 8 | 3.6 | 2.3 | 1.5 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1 | 2 | | 4.4 | 8 | 4.2 | 3.2 | 2.2 | 1.4 | 1.1 | 1.0 | 1.0 | 1.0 |
| 2 | 1 | 24.0 | 4.8 | 20 | | | 2.3 | 1.8 | 1.6 | | | 1.6 |
| 2 | 2 | | 4.4 | 23 | | | 3.0 | 2.8 | 2.8 | | | 2.8 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 21.4 | 4.8 | 2 | 1.2 | .8 | .8 | .8 | .8 | .8 | | .8 |
| 1 | 2 | | 4.9 | 2 | 1.2 | .8 | .8 | .8 | .8 | .8 | | .8 |
| 2 | 1 | 32.5 | 4.0 | 15 | | 1.8 | 1.5 | 1.5 | 1.5 | | | 1.5 |
| 2 | 2 | | 4.6 | 8 | 3.6 | 2.8 | 3.7 | 2.6 | 2.6 | | | 2.6 |

Soil: **Kranzburg silty clay loam (South Dakota)** Crop stage: Cultivated

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 3 min. | 8 min. | 13 min. | 18 min. | 23 min. | 28 min. | 33 min. | 38 min. | 43 min. | 48 min. | 53 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (July, 1963) | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.3 | 4.4 | 8.2 | 4.4 | 3.1 | 2.9 | 2.1 | 1.4 | 1.4 | 1.1 | 1.4 | 1.5 | | | |
| 1 | 2 | 25.3 | 4.0 | 8.0 | 4.0 | 3.4 | 2.7 | 2.3 | 1.8 | 1.7 | 1.5 | 1.4 | 1.2 | 1.3 | | |
| 2 | 1 | 25.3 | 4.4 | 12.0 | 4.4 | 4.4 | 3.7 | 3.0 | 2.3 | 1.9 | 1.7 | 1.8 | 1.7 | 1.9 | 1.9 | |
| 2 | 2 | 25.3 | 3.4 | 9.0 | 3.4 | 3.4 | 3.4 | 2.2 | 1.1 | .3 | .3 | .1 | .5 | 1.0 | | |
| 3 | 1 | 25.3 | 4.0 | 17.0 | 4.0 | 4.0 | 4.0 | 4.0 | 2.6 | 2.2 | 1.4 | 1.4 | 1.7 | 1.5 | | |
| 3 | 2 | 25.3 | 3.8 | 12.0 | 3.8 | 3.8 | 3.8 | 2.4 | 1.2 | 1.0 | .5 | .9 | 1.6 | 1.1 | | |
| Wet run (July, 1963) | | | | | | | | | | | | | | | | |
| 1 | 1 | 32.2 | 4.5 | 3.0 | 3.4 | 1.3 | 1.3 | 1.3 | 1.6 | 1.0 | 1.2 | | | | | 1.2 |
| 1 | 2 | 36.1 | 4.5 | 3.0 | 3.2 | .7 | .7 | .7 | .5 | .5 | | | | | | .6 |
| 2 | 1 | 32.7 | 4.5 | 2.0 | 2.1 | 1.4 | 1.3 | 1.2 | 1.2 | .9 | | | | | | 1.0 |
| 2 | 2 | 34.7 | 4.0 | 2.5 | 2.9 | .8 | .5 | .5 | .7 | .1 | | | | | | .5 |
| 3 | 1 | 35.3 | 4.4 | 6.0 | 4.4 | 1.1 | .9 | 1.1 | .8 | 1.1 | 1.0 | | | | | 1.0 |
| 3 | 2 | 31.1 | 3.8 | 3.0 | 2.3 | .4 | .6 | 1.0 | .1 | .3 | .5 | | | | | .4 |

*Appendix Table 3 (continued).*

Soil: **Miami sandy loam (Michigan)** Crop stage: Three feet high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (June, 1961) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 13.6 | 4.7 | 4.0 | 4.2 | 2.8 | 2.1 | 2.2 | 2.0 | 1.8 | 1.4 | 1.1 | | | | | | | 1.1 |
| 1 | 2 | 14.1 | 4.2 | 5.0 | 3.7 | 3.1 | 2.2 | 1.7 | 1.7 | 1.9 | 1.0 | .8 | .6 | .4 | .3 | | | | .4 |
| 2 | 1 | 14.3 | 4.4 | 9.0 | 3.9 | 2.8 | 2.0 | 2.6 | 3.3 | 3.4 | 3.1 | 3.8 | | | .3 | .6 | 1.2 | 1.2 | 1.2 |
| 2 | 2 | 14.8 | 4.7 | 3.5 | 4.3 | 3.6 | 3.1 | 3.3 | 2.9 | 3.2 | 2.8 | 2.8 | 2.3 | 2.3 | 2.2 | 2.4 | 2.5 | 2.1 | 2.3 |
| 3 | 1 | 16.7 | 4.7 | 8.0 | 4.3 | 3.6 | 3.2 | 2.9 | 2.3 | 2.7 | 1.9 | 1.7 | 1.6 | 1.5 | 1.5 | | | | 1.5 |
| 3 | 2 | 17.7 | 4.8 | 8.0 | 2.8 | 2.8 | 2.4 | 2.0 | 2.0 | 1.8 | 1.6 | 1.6 | 1.5 | 1.4 | 1.8 | 1.8 | 1.5 | 1.5 | 1.5 |
| Wet run (June, 1961) | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 17.8 | 4.7 | 1.0 | 1.5 | .6 | .4 | .5 | .7 | .4 | | .5 | .5 | .4 | | | | | .5 |
| 1 | 2 | 19.0 | 4.8 | 1.5 | 2.8 | 1.9 | 1.5 | 1.9 | 1.4 | .8 | 1.3 | 1.2 | 1.2 | 1.6 | 1.5 | .1 | .7 | .8 | .8 |
| 2 | 1 | 17.9 | 4.4 | 1.0 | .6 | .9 | 1.0 | 1.0 | .8 | | | | | | | | | | .9 |
| 2 | 2 | 19.5 | 4.7 | 2.0 | 3.1 | 2.1 | 1.9 | 1.6 | .8 | .6 | 1.1 | .8 | .4 | 1.3 | .3 | .3 | .9 | | .8 |
| 3 | 1 | 20.6 | 4.9 | 3.0 | 2.9 | 2.6 | 2.7 | 2.3 | 2.6 | 3.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | | | | 2.1 |
| 3 | 2 | 22.0 | 4.8 | 2.0 | 3.1 | 2.6 | .9 | 1.8 | 1.9 | .8 | 1.2 | 1.0 | .8 | 1.1 | 1.3 | .4 | | | 1.0 |

Soil: **Morton loam (North Dakota)** Crop stage: Tasseling

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 2.5 min. | 7.5 min. | 12.5 min. | 17.5 min. | 22.5 min. | 27.5 min. | 32.5 min. | 37.5 min. | 42.5 min. | 47.5 min. | 52.5 min. | 57.5 min. | 67.5 min. | 77.5 min. | 87.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run (August, 1962) | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 14.1 | 4.6 | 7 | 4.6 | 4.4 | 3.4 | 2.6 | 2.3 | 2.0 | 1.7 | 1.6 | | 1.3 | | 1.2 | 1.1 | 1.0 | 1.0 | |
| 1 | 2 | | 4.7 | 8 | 4.7 | 4.7 | 3.5 | 2.9 | 2.6 | 2.3 | 2.1 | 1.9 | | 1.6 | | 1.5 | 1.3 | 1.3 | 1.3 | |
| 2 | 1 | | 4.8 | 9 | 4.8 | 4.8 | 3.0 | 2.3 | 2.0 | 1.8 | 1.6 | 1.5 | | 1.3 | | 1.2 | 1.1 | 1.1 | 1.0 | |
| 2 | 2 | | 4.6 | 8 | 4.6 | 4.6 | 3.0 | 2.5 | 2.2 | 2.0 | 1.9 | 1.7 | | 1.6 | | 1.5 | 1.5 | 1.4 | 1.4 | |
| 3 | 1 | | 4.9 | 4 | 4.9 | 3.0 | 2.0 | 1.6 | 1.3 | 1.3 | 1.1 | 1.0 | | .8 | | .6 | .6 | .5 | .5 | |
| 3 | 2 | | 4.7 | 6 | 4.7 | 4.0 | 2.6 | 2.0 | 1.8 | 1.6 | 1.5 | 1.4 | | 1.3 | | 1.2 | 1.0 | 1.0 | 1.0 | |
| Wet run (August, 1962) | | | | | | | | | | | | | | | | | | | | |
| 1 | 1 | 27.0 | 5.2 | 1 | 2.7 | .6 | .4 | .4 | .4 | .3 | .3 | .3 | .3 | | | | | | | .3 |
| 1 | 2 | | 4.8 | 1 | 2.0 | .7 | .7 | .5 | .4 | .4 | .4 | .4 | .4 | | | | | | | .4 |
| 2 | 1 | | 3.0 | 6 | 5.0 | 3.0 | .8 | .6 | .5 | .5 | .4 | .4 | .4 | .4 | .4 | .4 | | | | .4 |
| 2 | 2 | | 4.5 | 2 | 3.7 | 1.1 | .9 | .7 | .7 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | | | | .6 |
| 3 | 1 | | 4.7 | 1 | 1.8 | .6 | .4 | .3 | .3 | .3 | .3 | .3 | | | | | | | | .3 |
| 3 | 2 | | 4.9 | 2 | 4.0 | 1.0 | .8 | .8 | .7 | .7 | .7 | .7 | .7 | .7 | | | | | | .7 |

*Appendix Table 3 (continued).*

Soil: **Port Byron silt loam (Minnesota)** Crop stage: Tasseling, crop removed but cultivated

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 10 min. | 20 min. | 30 min. | 40 min. | 50 min. | 60 min. | 70 min. | 80 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | (August, 1963) | | | | | | | | | | | |
| 1 | 1 | 18.1 | 4.6 | 8 | 4.0 | 2.1 | 1.7 | 1.4 | 1.4 | 1.3 | | | 1.3 |
| 1 | 2 | | 4.2 | 10 | | 1.6 | 1.4 | 1.2 | 1.2 | 1.1 | | | 1.1 |
| 2 | 1 | 24.7 | 4.4 | 10 | | 2.8 | 1.9 | 1.8 | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 |
| 2 | 2 | | 4.4 | 15 | | 3.3 | 2.8 | 2.4 | 2.3 | 1.9 | 1.7 | 1.6 | 1.6 |
| 3 | 1 | 8.5 | 4.2 | 10 | | 3.0 | 2.4 | 2.0 | 1.8 | 1.8 | 1.7 | | 1.7 |
| 3 | 2 | | 4.4 | 12 | | 2.8 | 2.2 | 1.9 | 1.7 | 1.6 | 1.6 | | 1.6 |
| Wet run | | | | | | | | | | | | | |
| 1 | 1 | 30.5 | 4.8 | 2 | 1.0 | .5 | .4 | .4 | | | | | .4 |
| 1 | 2 | | 4.8 | 3 | .8 | .6 | .5 | .4 | | | | | .4 |
| 2 | 1 | 35.3 | 4.5 | 1 | 1.8 | 1.2 | 1.1 | .9 | | | | | .9 |
| 2 | 2 | | 4.8 | 2 | 1.2 | .8 | .7 | .6 | | | | | .6 |
| 3 | 1 | 24.3 | 4.3 | 2 | .6 | .6 | .6 | .5 | | | | | .5 |
| 3 | 2 | | 4.4 | 2 | .4 | .4 | .4 | .4 | | | | | .4 |

Soil: **Russell silt loam (Indiana)** Crop stage: Cultivated

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | (July, 1961) | | | | | | | | | | | | | | | |
| 1 | 1 | 17.8 | 5.2 | 7.0 | 5.2 | 5.2 | 4.0 | 2.2 | 1.3 | .9 | .5 | .3 | .3 | .3 | .3 | .3 | |
| 1 | 2 | 16.1 | 5.2 | 5.0 | 5.2 | 4.9 | 3.2 | 1.9 | 1.2 | .8 | .6 | .6 | .6 | .6 | .6 | .6 | |
| 2 | 1 | 14.9 | 5.2 | 4.0 | 5.2 | 4.2 | 2.6 | 1.9 | 1.5 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | |
| 2 | 2 | 16.2 | 5.2 | 5.0 | 5.2 | 4.9 | 2.5 | 1.5 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | |
| 3 | 1 | 17.2 | 5.2 | 6.0 | 5.2 | 5.2 | 4.0 | 2.9 | 1.9 | 1.4 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | |
| 3 | 2 | 17.9 | 5.2 | 7.0 | 5.2 | 5.2 | 3.8 | 2.9 | 2.3 | 1.8 | 1.3 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | |
| Wet run | | | | | | | | | | | | | | | | | |
| 1 | 1 | 25.5 | 5.2 | 1.0 | 4.2 | 1.3 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 1 | 2 | 22.2 | 5.2 | 1.0 | 4.2 | 1.3 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 1 | 25.3 | 5.2 | 2.0 | 5.2 | 1.8 | 1.0 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 2 | 2 | 23.1 | 5.2 | 2.0 | 5.2 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 | .8 |
| 3 | 1 | 23.6 | 5.2 | 1.5 | 5.2 | 1.5 | 1.1 | .7 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |
| 3 | 2 | 25.4 | 5.2 | 1.5 | 5.2 | 1.7 | .9 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 | .6 |

*Appendix Table 3 (continued).*

Soil: **Sims loam (Michigan)** Crop stage: Cultivated, three feet high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 1.5 min. | 5.5 min. | 10.5 min. | 15.5 min. | 20.5 min. | 25.5 min. | 30.5 min. | 35.5 min. | 40.5 min. | 45.5 min. | 50.5 min. | 55.5 min. | 60.5 min. | 65.5 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | (July, 1961) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 16.6 | 4.9 | 12.0 | 4.7 | 4.6 | 4.4 | 4.1 | 4.1 | 4.1 | 3.6 | 3.0 | 3.0 | 2.6 | 2.5 | 2.5 | 1.8 | 2.3 | |
| 1 | 2 | 17.8 | 4.7 | 12.0 | 4.3 | 4.5 | 4.4 | 4.2 | 3.9 | 3.8 | 3.6 | 3.4 | 3.3 | 3.4 | 3.4 | 3.1 | 2.7 | 2.6 | |
| 2 | 1 | 16.3 | 4.4 | 31.0 | 4.1 | 4.0 | 4.1 | 4.0 | 4.0 | 3.9 | 3.5 | 3.5 | 3.4 | 3.1 | 3.2 | 3.5 | 3.1 | 3.1 | |
| 2 | 2 | 18.2 | 5.1 | 8.0 | 4.8 | 4.7 | 4.7 | 4.6 | 4.2 | 4.3 | 4.4 | 4.3 | 4.4 | 4.4 | 4.3 | 4.4 | 4.3 | 4.4 | |
| 3 | 1 | 15.8 | 5.9 | 32.0 | 5.6 | 5.5 | 5.4 | 5.4 | 5.3 | 5.2 | 5.0 | 5.1 | 5.0 | 4.7 | 4.7 | 4.7 | 4.3 | 4.4 | |
| 3 | 2 | 14.4 | 4.4 | 15.0 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.1 | 4.1 | 4.1 | 4.1 | 4.1 | 4.0 | 4.0 | 3.9 | 3.9 | |
| Wet run | | (July, 1961) | | | | | | | | | | | | | | | | | |
| 1 | 1 | 24.0 | 4.9 | 1.5 | 2.9 | 1.7 | 1.5 | 1.8 | 1.6 | 1.3 | | | | | | | | | 1.7 |
| 1 | 2 | 24.6 | 4.7 | 1.0 | 2.3 | 2.2 | 2.0 | 2.0 | 1.9 | 1.6 | 1.8 | | | | | | | | 1.7 |
| 2 | 1 | 24.3 | 4.4 | 23.0 | 2.3 | 2.5 | 2.0 | 1.9 | 2.0 | 1.7 | 1.3 | 1.4 | 1.3 | 1.3 | 1.3 | | | | 1.3 |
| 2 | 2 | 27.3 | 5.1 | 2.5 | 3.4 | 3.3 | 4.0 | 3.8 | 3.7 | 3.8 | 4.0 | 4.1 | 3.8 | 3.9 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 |
| 3 | 1 | 23.3 | 5.9 | 2.0 | 4.0 | 3.9 | 4.2 | 4.1 | 4.2 | 3.9 | 3.7 | 3.5 | 3.6 | 3.6 | 3.5 | | | | 3.5 |
| 3 | 2 | 22.2 | 4.4 | 2.0 | 3.3 | 3.1 | 2.7 | 2.3 | 2.3 | 1.9 | 2.0 | 2.0 | 1.5 | 1.5 | 1.5 | 1.5 | | | 1.5 |

Soil: **Sinai silty clay loam (South Dakota)** Crop stage: Cultivated, five feet high

| Identification Rep. | Dup. | Percent antecedent moisture, 0-6" deep | Rainfall intensity, in./hr. | Minutes to initial runoff | Mean rate, in./hr. 3 min. | 8 min. | 13 min. | 18 min. | 23 min. | 28 min. | 33 min. | 38 min. | 43 min. | 48 min. | 53 min. | 58 min. | Equil. rate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | (July, 1963) | | | | | | | | | | | | | | | |
| 1 | 1 | 34.8 | 3.3 | 22.0 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 2.8 | 2.4 | 1.8 | 1.8 | 1.8 | 1.6 | 1.6 | |
| 1 | 2 | 34.8 | 3.8 | 20.0 | 3.8 | 3.8 | 3.8 | 3.8 | 3.3 | 2.8 | 2.1 | 1.9 | 1.7 | 1.5 | 1.5 | 1.5 | |
| 2 | 1 | 34.8 | 3.8 | 12.8 | 3.8 | 3.8 | 3.8 | 1.8 | 1.6 | 1.5 | 1.3 | .9 | .7 | 1.0 | | | |
| 2 | 2 | 42.1 | 4.4 | 19.5 | 4.4 | 4.4 | 4.4 | 4.4 | 2.4 | 1.9 | 1.8 | 1.6 | 1.9 | 2.0 | 2.1 | | |
| 3 | 1 | 42.1 | 4.4 | 25.5 | 4.4 | 4.4 | 4.4 | 4.4 | 4.4 | 3.8 | 2.9 | 2.5 | 2.5 | 1.9 | 1.9 | 1.9 | |
| 3 | 2 | 42.1 | 3.6 | 18.5 | 3.6 | 3.6 | 3.6 | 3.6 | 2.1 | 1.4 | 1.9 | 1.4 | 1.4 | 1.1 | .9 | 1.0 | |
| Wet run | | (July, 1963) | | | | | | | | | | | | | | | |
| 1 | 1 | 45.7 | 3.8 | 3.0 | 2.6 | 1.5 | 1.4 | 1.2 | .7 | 1.1 | .7 | .9 | | | | | .9 |
| 1 | 2 | 45.5 | 3.8 | 3.0 | 3.6 | 2.5 | .7 | .5 | .5 | .6 | .6 | | | | | | .6 |
| 2 | 1 | 41.5 | 4.2 | 2.5 | 2.8 | 1.1 | 1.7 | 1.3 | 1.5 | 1.0 | .6 | | | | | | .8 |
| 2 | 2 | 37.3 | 4.1 | 3.5 | 2.9 | 1.6 | .4 | .4 | .5 | .8 | | | | | | | .5 |
| 3 | 1 | 41.9 | 3.5 | 9.0 | 3.5 | 2.8 | .6 | 1.0 | 1.1 | .3 | .5 | .5 | | | | | .4 |
| 3 | 2 | 44.9 | 3.3 | 1.8 | 1.3 | .2 | .4 | .4 | .4 | .2 | | | | | | | .4 |

# *APPENDIX B. SOIL PROFILE DESCRIPTIONS*

## Bearden silty clay loam

Location: Sec. 6-147-49, 220 feet east, 960 feet south of west 1/4 corner (15 feet north of the first E-W cross fence), Traill County, North Dakota
Slope: Nearly level (water runs E and W) Vegetation: Corn Drainage: Slow surface and internal
Sampled by Fred Schroer (6/29/65)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-6 | Ap | Very dark gray (10YR 3/1 dry) to black (10YR 2/1 moist) silty clay loam; cloddy and very fine crumb; hard when dry, friable when moist, plastic and slightly sticky when wet; many roots; slightly calcareous; abrupt, smooth boundary. |
| 6-10 | A11 | Colors like the Ap, silty clay loam; moderate very fine crumb structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; many roots; calcareous; abrupt, wavy boundary. |
| 10-16 | C1ca | Light gray (10YR 6/1 to 7/2 dry) streaked with very dark gray (10YR 5/1 with 3/1 moist) silty clay loam; weak medium prismatic and moderate fine crumb; slightly hard when dry, friable when moist, slightly plastic and slightly sticky when wet; many roots; strongly calcareous; clear, wavy boundary. |
| 16-28 | C2 | Light gray (2.5Y 7/2 dry) to pale brown (10YR 6/3 moist) silt loam, with a few medium, faint, light olive-brown mottles and grayish-brown streaks (moist); weak fine crumb and medium prismatic; slightly hard when dry, friable when moist, slightly sticky and plastic when wet; common roots; strongly calcareous with a few small lime nodules; clear boundary. |
| 28-40 | C3g | Light yellowish-brown (2.5Y 6/3 dry) to light olive-brown (2.5Y 5/4 moist) silt loam with common small, faint, grayish-brown and olive-brown (moist) mottles; weak fine crumb and granular; slightly hard, friable, slightly plastic, and slightly sticky; occasional root; calcareous; clear boundary. |
| 40-48 | C4g | Light gray (2.5Y 7/2 dry) to grayish-brown (2.5Y 5/2 moist) silty clay loam, with many medium, distinct, dark yellowish-brown to brown (moist) mottles; weak fine angular blocky; hard when dry, firm when moist, plastic and sticky when wet, calcareous to strongly calcareous in the common lime nodules; gradual boundary. |
| 48-60 | C5g | Basic colors as in C4g; silty clay loam to silt (varves) with many medium, distinct, dark yellowish-brown to yellowish-brown (moist) mottles; moderate medium platy and fine angular blocky; hard when dry, firm when moist, plastic and sticky when wet; calcareous. |

### Bearden silty clay loam physical data

#### Particle Size Distribution

| Size | Value | 0-6" depth | 6-10" depth | 10-16" depth | 16-28" depth | 28-40" depth | 40-48" depth |
|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 20.7 | 21.3 | 24.5 | 20.3 | 13.5 | 2.9 |
| Silt (50-2 μ) | Percent | 49.6 | 48.2 | 47.2 | 59.7 | 69.5 | 66.8 |
| Clay (< 2 μ) | Percent | 29.7 | 30.5 | 28.3 | 20.0 | 17.0 | 30.3 |

#### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.20 | 1.21 | 1.25 | 1.27 | 1.28 | 1.29 |
| | Standard error | .04 | .01 | .02 | .02 | .02 | .01 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1/10 | Percent by volume | 49.6 | 48.6 | 46.9 | 42.3 | 47.5 | 49.7 |
| | Standard error | .6 | 1.0 | 2.3 | 1.0 | 2.1 | 1.0 |
| 1/3 | Percent by volume | 41.4 | 38.4 | 38.8 | 30.5 | 38.5 | 46.4 |
| | Standard error | 1.6 | .3 | 1.5 | .6 | 3.0 | .7 |
| 1/2 | Percent by volume | 37.7 | 34.1 | 35.9 | 26.9 | 31.0 | 44.5 |
| | Standard error | .2 | .1 | .2 | 1.1 | 2.0 | 1.7 |
| 15 | Percent by volume | 24.1 | 22.0 | 20.6 | 15.7 | 16.9 | 27.6 |
| | Standard error | .1 | .1 | .1 | .1 | .1 | .2 |

## Bearden silty clay loam

Location: Sec. 1-147-50; center frame is 160 feet west, 980 feet south of east 1/4 corner, Traill County, North Dakota
Slope: Very slight Vegetation: Bromegrass Drainage: Slow surface and internal
Sampled by Fred Schroer (6/24/65)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-6 | Ap | Very dark (10YR 3/1 dry) to black (10YR 2/1 moist) heavy silt loam; weak fine blocky and crumb; friable when moist, slightly sticky and slightly plastic when wet; many roots; clear, smooth boundary. |
| 6-11 | A11 | Very dark gray to black (as above) silty clay loam; moderate medium blocky; friable when moist, slightly sticky and plastic when wet; many roots; becomes calcareous at the bottom; abrupt, wavy boundary. |
| 11-20 | C1ca | Light brownish-gray to light gray (2.5Y 6/2 to 7/2 dry) to dark gray (10YR 4/1 moist) silty clay loam; weak medium blocky and fine crumb structure; hard when dry, friable when moist, plastic and slightly sticky when wet; many roots; strongly calcareous; abrupt, irregular boundary cut by tongues of A material. |
| 20-31 | C2 | Light brownish-gray streaked with gray (10YR 6/2 and 7/1 dry) to dark grayish-brown (10YR 4/2 moist) heavy silt loam; weak medium prismatic, breaking easily to blocky; hard when dry, friable when moist, slightly plastic and slightly sticky when wet; many roots; calcareous; a few gypsum and lime nodules; clear boundary. |
| 31-38 | C3cs | Light yellowish-brown (2.5Y 6/3 dry) to light olive-brown (2.5Y 5/3 moist) silty clay loam, with many small, faint, olive-brown (moist) mottles; moderate fine granular and crumb; hard when dry, slightly firm when moist, slightly plastic and slightly sticky when wet; few roots; calcareous; many nests of fine gypsum crystals; clear boundary. |
| 38-50 | C4g | Light gray (2.5Y 7/2 dry) to grayish-brown (2.5Y 5/2 moist) silty clay loam, with many medium, distinct, dark yellowish-brown (10YR 4/4 to 5/5 moist) mottles; very hard when dry, firm when moist, plastic and sticky when wet; few roots; calcareous; clear boundary. |
| 50-60 | C5g | Colors and consistence similar to C4g, silty clay loam and a few silty clay layers; many large, distinct, dark yellowish-brown mottles; occasional roots; calcareous. |

## Bearden silty clay loam physical data

### Particle Size Distribution

| Size | Value | 0-6" depth | 6-11" depth | 11-20" depth | 20-31" depth | 31-38" depth | 38-50" depth |
|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 25.9 | 23.5 | 29.8 | 28.3 | 2.5 | 1.7 |
| Silt (50-2 μ) | Percent | 44.3 | 46.3 | 42.0 | 47.5 | 64.6 | 68.8 |
| Clay (< 2 μ) | Percent | 29.8 | 30.2 | 28.2 | 24.2 | 32.9 | 29.5 |

### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.09 | 1.20 | 1.27 | 1.27 | 1.32 | 1.26 |
| | Standard error | .02 | .03 | .01 | .01 | .01 | .03 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1/10 | Percent by volume | 46.7 | 49.4 | 46.6 | 42.0 | 48.7 | 50.1 |
| | Standard error | .2 | .5 | 1.5 | 2.3 | .8 | .5 |
| 1/3 | Percent by volume | 35.4 | 38.2 | 34.7 | 29.1 | 43.2 | 45.5 |
| | Standard error | .5 | .7 | .2 | .4 | 2.7 | 1.0 |
| 1/2 | Percent by volume | 32.2 | 33.6 | 31.5 | 28.1 | 38.9 | 40.7 |
| | Standard error | .3 | .2 | .5 | .5 | 1.7 | 1.3 |
| 15 | Percent by volume | 25.8 | 27.5 | 23.6 | 20.1 | 29.7 | 31.6 |
| | Standard error | .1 | .1 | .1 | .1 | .3 | .5 |

## Blount silty clay loam

Location: 475' S., 20' E. of NW corner of NW 1/4, Sec. 19, T3S, R7E, Bath Twp., Allen County, Ohio
Slope: 1 1/2% Vegetation: Alfalfa-bromegrass Drainage: Imperfectly to moderately well drained
Sampled by Wilding and Schmidt (7/30/65)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Dark grayish-brown (10YR 4/2) light silty clay loam; cloddy structure, breaking to moderate medium and coarse granular structure; hard when dry, slightly firm when moist; abrupt, smooth lower boundary; pH 6.2. An intermittent A2 horizon from 8-9" in depth is sometimes present in this profile but because of its thinness was not sampled. |
| 8-11 | B1t | Dark yellowish-brown (10YR 4/4) clay; weak medium prismatic structure, breaking to weak to moderate medium subangular blocky structure; hard when dry, firm when moist; clear, smooth lower boundary; pH 5.3. (This horizon could possibly be designated B & A.) |
| 11-17 | B21t | Dark yellowish-brown (10YR 4/4) clay; moderate to strong, medium to coarse prismatic structure, breaking to strong coarse angular blocky structure; hard when dry, firm when moist; clear, smooth lower boundary; pH 6.0. |
| 17-24 | B22t | Dark yellowish-brown (10YR 4/3) clay; moderate to strong coarse prismatic structure, breaking to strong coarse angular blocky structure; hard when dry, firm when moist, clear, wavy lower boundary; pH 7.2 |
| 24-32 | B3t | Three-fourths dark yellowish-brown (10YR 4/4) heavy silty clay loam to light clay; moderate medium and coarse prismatic structure, breaking to moderate medium angular blocky structure; hard when dry, firm when moist; slightly calcareous; gradual, smooth boundary. |
| 32-48 | C1 | Dark yellowish-brown (10YR 4/4) fine clay loam; very few micropores (less than 5 percent); weak to moderate, coarse prismatic structure, breaking to moderate coarse angular blocky structure; hard when dry, firm when moist; strongly calcareous; gradual, smooth boundary. Sampled at 32-40" and 40-48". |
| 48-58 | C2 | Dark yellowish-brown (10YR 4/4) clay loam; very weak, very coarse (4-8") prismatic structure; hard when dry, firm when moist; very compact; strongly calcareous; gradual, smooth lower boundary. |
| 58-72 | C3 | Yellowish-brown (10YR 5/4) clay loam; nearly massive but with a few very weak, very coarse (6-10") prisms; hard when dry, firm when moist; strongly calcareous. |
| Note: | | The prismatic structural units in the C2 and C3 horizons break into coarse, platy units. |

### Blount silty clay loam physical data

#### Particle Size Distribution

| Size | Value | 2-5" depth | 14-17" depth | 19-22" depth | 27-30" depth | 38-41" depth | 52-55" depth |
|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 20.3 | 12.7 | 14.3 | 15.8 | 16.2 | 15.7 |
| | Standard error | .579 | .071 | .100 | .354 | .200 | .200 |
| Silt (50-2 μ) | Percent | 48.2 | 36.7 | 38.0 | 43.1 | 43.5 | 44.5 |
| | Standard error | .200 | .350 | .050 | .663 | .475 | .950 |
| Clay (< 2 μ) | Percent | 31.5 | 50.6 | 47.7 | 41.1 | 40.3 | 39.8 |
| | Standard error | .200 | .071 | .158 | .354 | .476 | .752 |

#### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.42 | 1.47 | 1.54 | 1.66 | 1.71 | 1.76 |
| | Standard error | .014 | .011 | .026 | .009 | .015 | .009 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 (sat'd.) | Percent by volume | 44.7 | 51.6 | 44.9 | 39.8 | 38.9 | 36.5 |
| | Standard error | .306 | .478 | .519 | .281 | .425 | .511 |
| .06 | Percent by volume | 38.1 | 42.7 | 39.0 | 35.7 | 33.6 | 32.9 |
| | Standard error | .310 | .513 | .528 | .307 | .344 | .330 |
| .33 | Percent by volume | 34.9 | 39.8 | 35.4 | 32.9 | 30.4 | 30.5 |
| | Standard error | .346 | .406 | .485 | .348 | .308 | .310 |
| 2.00 | Percent by volume | 33.4 | 37.4 | 34.1 | 31.7 | 29.0 | 28.8 |
| | Standard error | .319 | .604 | .521 | .276 | .394 | .388 |

## Bodenburg silt loam

Location: NW 1/4, NW 1/4, Sec. 9, T17N, R2E, Seward Meridian, Alaska
Slope: Level to steep terraces Vegetation: White spruce, birch, aspen Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 2-1½ | Aoo | Litter of leaves, needles, and twigs. |
| 1½-0 | Ao | Mat of partially decayed organic materials; dominant color very dark brown (10YR 2/2); abrupt, smooth boundary. |
| 0-3 | A2(?) | Gray (5Y 5/1) silt loam, mottled with very dark grayish brown; weakly developed very fine subangular block structure; friable; many roots; abrupt, smooth lower boundary. |
| 3-8 | B(?) | Mixed very dark grayish-brown (10YR 3/2), dark brown (10YR 4/3), and dark gray (5Y 4/1) silt loam, with very dark grayish brown dominant; weakly developed medium subangular block structure; friable; few roots; clear, wavy boundary. |
| 8-27 | C1 | Gray (5Y 5/1) silt loam mottled with dark brown; occasional horizontal streaks of dark brown; weakly developed medium subangular blocky structure, breaking under pressure to coarse plates; friable; few roots; clear, wavy boundary. |
| 27-36 | C2 | Mixed olive-brown (2.5Y 4/4) and gray (5Y 5/1) silt loam, with olive brown predominant; massive but friable; very few roots; abrupt lower boundary. |
| 36-48+ | D | Coarse sand and gravel, probably glacial outwash; dominant color dark brown (10YR 3/3). |

### Bodenburg silt loam physical data

#### Particle Size Distribution

| Size | Value | 0-5" depth | 6-9" depth | 12-15" depth | 30-33" depth |
|---|---|---|---|---|---|
| Sand (> 50μ) | Percent | 21.67 | 18.42 | 16.83 | 23.31 |
| | Standard error | 1.20 | 2.33 | 3.52 | 4.43 |
| Silt (50-2μ) | Percent | 74.46 | 77.98 | 77.21 | 73.04 |
| | Standard error | .90 | 3.46 | 3.76 | 1.67 |
| Clay (< 2μ) | Percent | 3.04 | 3.60 | 3.98 | 3.66 |
| | Standard error | .53 | 1.62 | .73 | 1.10 |

#### Bulk Density (undisturbed samples)

| | | | | | |
|---|---|---|---|---|---|
| | $g/cm^3$ | .75 | .90 | 1.08 | 1.05 |
| | Standard error | .06 | .09 | .09 | .04 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | |
|---|---|---|---|---|---|
| .06 | Percent by volume | 48.1 | 54.4 | 42.7 | 47.0 |
| | Standard error | 1.60 | 1.72 | .67 | .98 |
| .08 | Percent by volume | 41.0 | 50.9 | 49.0 | 42.6 |
| | Standard error | .75 | 1.59 | .98 | 1.52 |
| .17 | Percent by volume | 37.4 | 40.3 | 43.0 | 42.3 |
| | Standard error | 1.50 | 1.10 | .50 | .96 |
| .33 | Percent by volume | 23.5 | 25.2 | 27.8 | 27.7 |
| | Standard error | 1.20 | 3.00 | 1.20 | 1.21 |
| .67 | Percent by volume | 24.0 | 20.5 | 21.6 | 18.7 |
| | Standard error | 1.40 | .98 | .48 | .89 |
| 2.31 | Percent by volume | 15.5 | 19.2 | 14.3 | 18.0 |
| | Standard error | .73 | .34 | .87 | .76 |
| 7.14 | Percent by volume | 8.4 | 12.0 | 10.3 | 12.3 |
| | Standard error | .39 | .94 | .81 | .87 |
| 15.00 | Percent by volume | 9.6 | 8.2 | 7.0 | 10.2 |
| | Standard error | .27 | .58 | .97 | .80 |

## Canfield silt loam

Location: NW 1/4, Sec. 16, T16N, R12E (East Union Twp., Wayne County, Ohio)
Slope: 4 percent Vegetation: Bromegrass sod Drainage: moderately well to well drained
Sampled: 700' south and 525' east of NW corner of NW 1/4, Sec. 16 on East Badger unit, OARDC, Wooster, Ohio, west end of center sod plot of NC-40 study site, NW corner lot 706.
Sampled by Wilding and Rutledge (6/2/74)

| Depth (in.) | Horizon | |
|---|---|---|
| 0-6 | Ap | Dark grayish-brown (10YR 4/2) silt loam; a few common, medium yellowish-brown (10YR 5/6) particles of B1 horizon present; cloddy, breaking to weak fine granular structure; friable; abrupt, smooth lower boundary; pH 6.2. |
| 6-10 | B1 | Yellowish-brown (10YR 5/6) light silty clay loam; weak moderate and fine subangular blocky structure; slightly firm; clear, smooth boundary; pH 5.7. |
| 10-14 | B21 | Yellowish-brown (10YR 5/6) silty clay loam; weak coarse subangular blocky structure, breaking to weak to moderate medium and fine subangular blocky structure; slightly firm; clear, smooth lower boundary; pH 5.5. |
| 14-19 | B22 | Dark yellowish-brown (10YR 4/4) heavy loam or light clay loam; weak to moderate, coarse subangular blocky structure, breaking to weak to moderate coarse platy structure; firm to slightly fragic; clear, smooth lower boundary; pH 5.3. |
| 19-27 | B23X | Dark yellowish-brown and yellowish-brown (10YR 4/4 and 4.5/4) loam; weak coarse polygons, breaking to moderate medium platy structure; very firm and fragic; clear, smooth lower boundary; pH 4.8. |
| 27-38 | B24X | Yellowish-brown (10YR 4.5/4) loam; structure as in preceding horizon; very firm and fragic; clear, smooth lower boundary; pH 5.0. |
| 38-43 | B3X | Dark yellowish-brown to olive-brown (1Y 4/4) loam; very weak coarse polygons; firm and slightly fragic; clear, smooth lower boundary; pH 6.3. |
| 43-57 | C1 | Color same as above horizon; loam; nearly massive; firm; pH 6.7. |

Note: Zone 14-19" has some characteristics of a fragipan but is only incipient in development--it has platy structure and a slightly fragic consistence.

### Canfield silt loam physical data

#### Particle Size Distribution

| Size | Value | 2-5" depth | 6-9" depth | 10-13" depth | 14-17" depth | 19-22" depth | 43-46" depth |
|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 19.3 | 15.0 | 23.0 | 28.9 | 30.0 | 32.0 |
| | Standard error | .700 | .700 | .700 | .867 | .900 | .960 |
| Silt (50-2μ) | Percent | 65.9 | 61.4 | 50.1 | 46.0 | 46.5 | 46.5 |
| | Standard error | 1.977 | 1.842 | 1.500 | 1.380 | 1.395 | 1.395 |
| Clay (< 2μ) | Percent | 14.8 | 23.6 | 26.9 | 25.1 | 23.5 | 21.5 |
| | Standard error | .700 | .708 | .807 | .753 | .705 | .645 |

#### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.40 | 1.49 | 1.49 | 1.60 | 1.77 | 1.80 |
| | Standard error | .024 | .010 | .013 | .013 | .018 | .010 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0(Sat'd.) | Percent by volume | 44.2 | 43.5 | 46.6 | 41.3 | 34.4 | 29.7 |
| | Standard error | .353 | .444 | .740 | .588 | .726 | .548 |
| .06 | Percent by volume | 39.2 | 36.3 | 37.6 | 33.8 | 30.7 | 28.3 |
| | Standard error | .351 | .530 | .465 | .339 | .365 | .150 |
| .33 | Percent by volume | 35.9 | 31.5 | 33.7 | 31.4 | 28.9 | 27.0 |
| | Standard error | .326 | .545 | .473 | .370 | .306 | .088 |
| 2.00 | Percent by volume | 30.6 | 30.4 | 32.8 | 29.6 | 27.6 | 25.4 |
| | Standard error | .308 | .546 | .399 | .307 | .280 | .173 |

## Cincinnati silt loam

Location: N 1/2 of section 16, T11N R3W, Owen County, Indiana
Sloped: 8 Percent Vegetation: Grass mixture Drainage: Well drained
Sampled 8/7/61

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Dark brown silt loam; weak fine granular structure; friable when moist and nonsticky when wet; neutral. |
| 8-11 | B1 | Dark brown silt loam; weak, fine to medium subangular and angular blocky structure; friable when moist. |
| 11-24 | B21 | Dark brown silty clay loam; moderate medium to coarse subangular blocky structure; slightly firm when moist and slightly sticky when wet. |
| 24-43 | B22 | Light yellowish-brown to strong brown silty clay loam; weak, medium to coarse subangular blocky structure; friable when moist. |
| 43+ | B23 | Strong brown clay loam streaked with pale brown; weak, medium to coarse angular blocky structure; firm when moist and sticky when wet. |

### Cincinnati silt loam physical data

#### Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-36" depth | 36-48" depth | 48-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 7.4 | 5.4 | 4.3 | 4.5 | 11.3 | 17.4 | 20.6 |
| | Standard error | .53 | .10 | .33 | .53 | 3.52 | 3.95 | 5.64 |
| Silt (50-2 μ) | Percent | 78.2 | 77.1 | 72.4 | 68.7 | 64.4 | 59.8 | 57.4 |
| | Standard error | .28 | .33 | 3.55 | 2.70 | 2.47 | 3.45 | 5.47 |
| Clay (< 2 μ) | Percent | 14.5 | 17.5 | 23.3 | 26.8 | 24.3 | 22.8 | 22.1 |
| | Standard error | .37 | .31 | 3.64 | 2.22 | 1.95 | .84 | .56 |

#### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.26 | 1.24 | 1.33 | 1.36 | 1.36 | 1.43 | 1.56 |
| | Standard error | .008 | .025 | .066 | .130 | .073 | .084 | .008 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Saturated | Percent by volume | 42.0 | 42.2 | 43.9 | 41.6 | 42.6 | 39.8 | 35.4 |
| | Standard error | .64 | .83 | 1.34 | .95 | 1.65 | 2.46 | 2.63 |
| | Percent by volume | 37.3 | 35.1 | 37.8 | 38.5 | 37.8 | 38.8 | 31.7 |
| .05 | Standard error | .32 | .89 | 1.10 | .72 | .63 | .65 | 1.43 |
| | Percent by volume | 35.7 | 34.6 | 37.2 | 38.2 | 38.5 | 37.3 | 29.8 |
| .10 | Standard error | .16 | .56 | .56 | .65 | 1.35 | .84 | .83 |
| | Percent by volume | 22.5 | 31.5 | 34.6 | 35.8 | 35.8 | 35.6 | 27.5 |
| .20 | Standard error | .25 | .32 | .72 | .84 | .98 | 1.32 | .53 |
| | Percent by volume | 30.0 | 29.3 | 32.9 | 33.9 | 34.1 | 33.2 | 25.4 |
| .33 | Standard error | .13 | .68 | .42 | .75 | .32 | .56 | .64 |
| | Percent by volume | 23.9 | 23.6 | 26.9 | 30.1 | 30.2 | 25.3 | 23.4 |
| 1.00[a] | Standard error | .13 | .12 | .48 | 1.06 | .57 | 0 | .22 |
| | Percent by volume | 17.6 | 19.1 | 22.3 | 24.8 | 23.4 | 19.2 | 21.5 |
| 3.00[a] | Standard error | .13 | .27 | .19 | .14 | 0 | 1.32 | .56 |
| | Percent by volume | 15.0 | 16.2 | 19.7 | 21.9 | 20.9 | 16.0 | 18.9 |
| 5.00[a] | Standard error | 0 | .27 | .19 | .14 | .38 | .14 | .16 |
| | Percent by volume | 12.9 | 14.4 | 17.3 | 20.0 | 19.2 | 14.3 | 17.0 |
| 10.00[a] | Standard error | .36 | .45 | 0 | .14 | .14 | .14 | .22 |
| | Percent by volume | 11.2 | 11.8 | 14.9 | 19.3 | 16.6 | 12.4 | 14.8 |
| 15.00[a] | Standard error | .18 | .18 | .37 | 2.04 | .38 | .31 | .44 |

[a]Disturbed samples.

## Cisne silt loam

Location: T6N, R2E, Sec, 22, NE 160, NE40, NW10, Fayette County, Illinois
Slope: 1 percent Drainage: Poor
Sampled 6/22/64

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | A1 | Very dark grayish-brown (10YR 3/2) to gray (10YR 5/1 dry) friable silt loam; slightly sticky and slightly plastic when wet, very hard when dry; weak fine crumb structure; clear, smooth boundary. |
| 8-13 | A21 | Dark grayish-brown (10YR 4/2) to light brownish-gray (10YR 6/2 dry) friable silt loam; slightly sticky and slightly plastic when wet; weak fine subangular blocky structure; gradual, smooth boundary. |
| 13-18 | A22 | Light brownish-gray (10YR 6/2) friable silty clay loam; slightly sticky and slightly plastic when wet; very weak, medium to coarse platy structure; very strongly acid (pH 4.5); abrupt, smooth boundary. |
| 18-21 | AB | Grayish-brown (10YR 5/2) light silty clay loam mottled with strong brown (25 percent 7.5YR 5/8); friable; slightly sticky and slightly plastic when wet; strong medium blocky structure coated with light gray to gray (10YR 6/1) silt from the A22; very strongly acid (pH 4.5); abrupt, smooth boundary. |
| 21-29 | B21 | Light brownish-gray (10YR 6/2) silty clay mottled with strong brown (25 percent 7.5YR 5/8); slightly sticky and slightly plastic when wet; firm; moderate coarse blocky structure coated with grayish-brown (10YR 5/2) silt; gradual, smooth boundary. |
| 29-36 | B22 | Light gray to gray (10YR 6/1) mottled with strong brown (10 percent 7.5 YR 5/6) and dark yellowish-brown (5 percent 10YR 4/4) silty clay with 15 percent very dark gray (7.5YR 3/0) and very dark brown (10YR 2/2) manganese concretions; slightly sticky and slightly plastic when wet; firm; moderate coarse blocky structure coated with gray (10YR 5/1) silt; gradual, smooth boundary. |
| 36-45 | C1-IIA1 | Gray (10YR 5/1) mottled with strong brown (10 percent 7.5YR 4/8) and yellowish-brown (5 percent 10YR 5/8) silty clay loam with common very dark brown (10YR 2/2) manganese concretions; nonsticky and slightly plastic when wet; friable; massive vesicular structure; gradual, smooth boundary. |
| 45-54 | IIA1 | Grayish-brown (10YR 5/2) mottled with yellowish-brown (25 percent 10YR 5/4) silt loam with few dark brown (7.5YR 3/2) and very dark grayish-brown (10YR 3/2) manganese concretions (about 4mm size); nonsticky and slightly plastic when wet; friable; massive vesicular structure with grayish-brown (10YR 5/2) clay coatings in vesicules and root channels; gradual, smooth boundary. |
| 54-60+ | IIB1 | Grayish-brown (10YR 5/2) mottled with brown to dark brown (10 percent 7.5YR 4/4) and yellowish-brown (15 percent 10YR 5/6) silt loam sith a very few very dark brown (10YR 2/2) manganese concretions (about 4 mm size); slightly sticky and slightly plastic when wet; friable; massive vesicular structure with grayish-brown (10YR 5/2) clay coatings in vesicles and root channels. |

### Cisne silt loam physical data

Particle Size Distribution

| Size | Value | 0-8" depth | 8-13" depth | 13-18" depth | 21-29" depth | 29-36" depth | 36-45" depth | 45-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 14.0 | 9.4 | 5.8 | 4.5 | 3.4 | 14.7 | 16.7 |
| | Standard error | 1.0 | .4 | .6 | .5 | .1 | 1.4 | 1.0 |
| Silt (50-2 μ) | Percent | 65.7 | 70.0 | 57.8 | 50.1 | 49.3 | 55.2 | 57.7 |
| | Standard error | .1 | .8 | 1.6 | .4 | .2 | 1.9 | .1 |
| Clay (< 2 μ) | Percent | 20.3 | 20.6 | 36.4 | 45.4 | 47.3 | 30.1 | 25.6 |
| | Standard error | .9 | .4 | 1.0 | .9 | .3 | .5 | .9 |

Bulk Density (undisturbed samples)

| | | | | | | |
|---|---|---|---|---|---|---|
| $g/cm^3$ | 1.33 | 1.34 | 1.45 | 1.49 | 1.69 |
| Standard error | .03 | .03 | .07 | .07 | .09 |

Moisture Content (moisture-releases values)[a]

| Bars tension | | | | | | |
|---|---|---|---|---|---|---|
| | Percent by volume | 42.8 | 38.9 | 59.9 | 61.1 | 54.5 |
| .10 | Standard error | .2 | 0 | .3 | .1 | .1 |
| | Percent by volume | 33.5 | 33.3 | 49.9 | 48.6 | 42.7 |
| .33 | Standard error | .1 | .2 | .4 | .2 | .1 |
| | Percent by volume | 15.8 | 18.0 | 30.9 | 30.4 | 26.8 |
| 1.0 | Standard error | .1 | .1 | .1 | .1 | .1 |
| | Percent by volume | 15.1 | 17.0 | 30.0 | 28.9 | 25.0 |
| 3.0 | Standard error | .3 | 0 | .1 | .1 | 0 |
| | Percent by volume | 11.9 | 13.2 | 23.9 | 20.7 | |
| 5.0 | Standard error | .1 | .2 | 0 | .1 | |
| | Percent by volume | 8.3 | 9.5 | 21.7 | 19.1 | 17.2 |
| 15.0 | Standard error | .3 | 0 | .1 | .2 | .3 |

[a]Disturbed samples.

## Cisne silt loam

Location: T10N, R9E, Sec. 31, SW 160, NE40, Plot 109A Toledo Experiment Field, Cumberland County, Illinois
Slope: 1¼ percent Drainage: Poor Sampled by: J.B. Fehrenbacher and P.E. Johnson (7/28/58)

| Depth (in.) | Horizon | |
|---|---|---|
| 0-8 | A1 | 10YR 3/2 friable silt loam; moderate fine crumb structure grading to weak medium platy in lower part; clear, smooth boundary. |
| 8-12 | A21 | 10YR 4/2 mixed with 10YR 3/2 (30 percent friable silt loam; numerous iron concretions; weak medium platy structure; clear, smooth boundary. |
| 12-17 | A22 | 10YR 6.5/2 and some 4/2 friable silt loam; weak, medium to fine platy structure; numerous iron concretions; abrupt, smooth boundary. |
| 17-24 | B21 | 10YR 6/2 firm, fine silty clay loam with many fine, faint 10YR 5/4 mottlings and many clay-organic coatings; strong medium prismatic structure, breaking to strong medium angular blocky; clear, smooth boundary. |
| 24-32 | B22 | 10YR 6/1 firm, fine silty clay loam with common fine, faint 10YR 5/4 mottlings and some clay and few organic coatings; moderate, medium to coarse angular blocky structure; gradual, smooth boundary. |
| 32-42 | B3 | 10YR 6/1 firm silty clay loam with common medium faint 10YR 5/8 mottlings and some clay coatings; weak, medium to coarse angular blocky structure; diffuse, irregular boundary. |
| 42-50 | D | 10YR 5/1.5 firm silty clay loam with some sand; few medium, distinct 7.5YR 4/4 mottlings; weak medium angular blocky structure. |

## Cisne silt loam physical data

### Particle Size Distribution

| Size | Value | 0-8" depth | 8-12" depth | 12-17" depth | 17-32" depth | 32-42" depth | Over 42" depth |
|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 15.1 | 15.0 | 13.0 | 5.9 | 5.9 | 8.8 |
| | Standard error | 1.4 | 0 | 1.0 | .2 | .5 | 1.4 |
| Silt (50-2μ) | Percent | 69.0 | 67.3 | 67.2 | 53.8 | 57.1 | 59.7 |
| | Standard error | 1.0 | .5 | 1.0 | .5 | 1.0 | .9 |
| Clay (< 2μ) | Percent | 15.9 | 18.2 | 19.8 | 40.3 | 37.0 | 31.5 |
| | Standard error | .3 | .5 | 0 | .3 | .5 | .5 |

### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.30 | 1.17 | 1.37 | 1.29 | 1.46 | 1.47 |
| | Standard error | .02 | .03 | .01 | .02 | .02 | .06 |

### Moisture Content (moisture-release values)[a]

| Bars tension | | | | | | |
|---|---|---|---|---|---|---|
| .10 | Percent by volume | 46.1 | 42.5 | 43.2 | 63.4 | 53.3 |
| | Standard error | .3 | .4 | .8 | .1 | 1.4 |
| .33 | Percent by volume | 40.7 | 34.5 | 38.8 | 51.1 | 50.4 |
| | Standard error | 1.3 | .3 | .5 | .1 | 0 |
| 1.00 | Percent by volume | 26.9 | 24.4 | 30.7 | 41.5 | 42.5 |
| | Standard error | .2 | .5 | 1.0 | .4 | .1 |
| 3.00 | Percent by volume | 16.2 | 14.6 | 18.8 | 34.2 | 32.6 |
| | Standard error | .1 | .2 | .1 | .2 | .2 |
| 5.00 | Percent by volume | 12.0 | 10.9 | 11.1 | 30.8 | 27.6 |
| | Standard error | .1 | .1 | .1 | .5 | .2 |
| 15.00 | Percent by volume | 9.9 | 9.5 | 7.8 | 26.8 | 24.1 |
| | Standard error | .2 | .0 | .8 | 0 | .3 |

[a]Disturbed samples.

## Clermont silt loam

Location: SE ¼ SE ¼ of Section 5T6N R 7E, Jennings County, Indiana
Slope: Less than 1 percent Vegetation: Cultivated Drainage: Poorly drained Sampled 6/19/61

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Light gray to pale yellowish-gray friable fine granular silt loam; numerous small, rounded, soft iron and manganese concretions; strongly to very strongly acid. |
| 8-24 | A22 | Light gray friable silt loam, blotched, streaked, and mottled with pale yellow; massive structure crushes easily into medium-sized granules; low content of grit and pebbles; strongly to very strongly acid. |
| 24-28 | B1x | Light gray light silty clay loam, faintly mottled with pale yellow; weakly developed fine to medium prisms, easily crushed into medium granules; strongly to very strongly acid. |
| 28-54 | B21x | Intensely mottled gray and pale yellow silty clay loam; well-developed medium to coarse prismatic structure; firm when moist; strongly to very strongly acid. |

## Clermont silt loam physical data

### Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-36" depth | 36-48" depth | 48-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 13.2 | 13.8 | 13.5 | 13.5 | 12.3 | 12.1 | 14.7 |
| | Standard error | 1.12 | 1.77 | .71 | .52 | 2.22 | 1.19 | 1.38 |
| Silt (50-2μ) | Percent | 74.2 | 70.9 | 68.6 | 68.4 | 67.0 | 60.4 | 61.5 |
| | Standard error | 1.95 | 2.50 | .34 | .45 | 1.85 | 1.52 | .61 |
| Clay (< 2μ) | Percent | 12.9 | 15.3 | 17.5 | 18.2 | 20.7 | 27.5 | 23.9 |
| | Standard error | 1.32 | .87 | .77 | 1.16 | 1.50 | .81 | .99 |

### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.41 | 1.46 | 1.51 | 1.51 | 1.52 | 1.53 | 1.51 |
| | Standard error | .036 | .056 | .000 | .000 | .028 | .014 | .000 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Saturated | Percent by volume | 55.0 | 57.4 | 55.0 | 59.5 | 56.1 | 60.9 | 62.2 |
| | Standard error | .57 | 1.20 | .50 | .71 | 1.20 | 3.04 | 1.64 |
| .05 | Percent by volume | 41.6 | 41.3 | 41.1 | 43.5 | 43.2 | 45.9 | 46.1 |
| | Standard error | .50 | 0 | .42 | 0 | .28 | 2.69 | 1.46 |
| .10 | Percent by volume | 38.8 | 40.3 | 39.4 | 40.2 | 42.0 | 44.2 | 44.1 |
| | Standard error | .50 | .42 | .57 | 0 | .57 | 2.75 | .85 |
| .20 | Percent by volume | 36.5 | 37.8 | 37.1 | 39.1 | 39.4 | 43.0 | 43.5 |
| | Standard error | .32 | .64 | .25 | .32 | 0 | 2.12 | 1.85 |
| .33 | Percent by volume | 35.1 | 36.9 | 37.1 | 37.6 | 38.5 | 41.8 | 42.9 |
| | Standard error | .42 | .78 | 1.06 | .42 | .22 | 1.98 | 1.86 |
| 1.00[a] | Percent by volume | 23.5 | 24.9 | 25.2 | 25.3 | 27.4 | 32.3 | 30.0 |
| | Standard error | 1.52 | 1.09 | .99 | .98 | 2.41 | 1.95 | 1.99 |
| 3.00[a] | Percent by volume | 15.2 | 15.0 | 17.1 | 18.3 | 19.5 | 24.6 | 23.4 |
| | Standard error | .24 | .20 | .70 | .73 | 2.93 | 2.98 | 1.02 |
| 5.00[a] | Percent by volume | 12.6 | 13.5 | 14.3 | 15.7 | 17.3 | 22.6 | 21.6 |
| | Standard error | .66 | 1.07 | 1.78 | 1.26 | 2.46 | 3.24 | 1.11 |
| 10.0[a] | Percent by volume | 9.9 | 10.4 | 11.5 | 13.0 | 14.2 | 18.9 | 19.9 |
| | Standard error | .32 | .14 | .45 | 1.36 | 2.02 | 2.45 | 1.56 |
| 15.0[a] | Percent by volume | 9.2 | 9.6 | 10.3 | 11.4 | 12.9 | 17.9 | 17.6 |
| | Standard error | .53 | 1.14 | .98 | 1.31 | 2.10 | 2.94 | .64 |

[a]Disturbed samples.

## Dudley clay loam

Location: Plankinton County, South Dakota
Slope: 0 to 1 percent  Vegetation: Bromegrass  Drainage: Poorly drained  Sampled: August 1963

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | A1 | Black friable clay loam; granular or prismatic structure. |
| 8-10 | A2 | Gray friable clay loam; blocky structure. |
| 10-22 | B2 | Dark gray friable clay loam; prismatic structure, grading into brown soil in the lower part. |
| 22-40 | Cca | Light olive-brown loam; highly calcareous; moderately saline. |
| 40-60 | C | Olive-brown clay loam or loam glacial till; moderately calcareous; slightly to moderately saline. |

## Dudley clay loam physical data

### Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth | 42-48" depth | 48-60" depth |
|---|---|---|---|---|---|---|---|---|---|---|
| Sand (> 50μ) | Percent | 24.7 | 31.7 | 43.9 | 44.2 | 39.0 | 39.0 | 44.0 | 41.6 | 34.1 |
| | Standard error | .9 | 2.3 | .9 | 0 | .2 | 0 | 4.7 | 4.6 | 4.9 |
| Silt (50-2μ) | Percent | 45.2 | 32.9 | 25.8 | 34.7 | 37.1 | 36.4 | 34.5 | 36.0 | 39.5 |
| | Standard error | 1.5 | 2.6 | .9 | 3.8 | .1 | 0 | 2.3 | 3.0 | 1.7 |
| Clay (< 2μ) | Percent | 30.1 | 35.4 | 30.3 | 23.6 | 23.9 | 24.7 | 21.5 | 22.3 | 26.4 |
| | Standard error | .6 | .2 | .5 | 1.3 | .5 | 0 | 2.4 | 1.6 | 3.1 |

### Bulk Density (undisturbed samples)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.27 | 1.36 | 1.40 | 1.46 | 1.44 | 1.44 | 1.59 | 1.44 | 1.54 |
| | Standard error | .01 | .03 | .03 | .02 | .07 | .05 | .02 | .03 | .04 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/10 | Percent by volume | 53.5 | 57.4 | 47.5 | 47.7 | 47.8 | 48.0 | 49.1 | 47.8 | 54.1 |
| | Standard error | .7 | .5 | 2.7 | 1.0 | 2.9 | 1.6 | 1.4 | 1.3 | 4.5 |
| 1/3 | Percent by volume | 51.8 | 55.6 | 45.4 | 46.3 | 44.4 | 46.2 | 47.4 | 44.1 | 49.4 |
| | Standard error | .8 | .7 | 1.6 | 1.1 | 2.8 | 1.5 | 1.3 | 2.5 | 3.3 |
| 1 | Percent by volume | 47.6 | 49.1 | 43.1 | 41.3 | 43.8 | 44.6 | 44.5 | 45.1 | 44.7 |
| | Standard error | 1.4 | 2.3 | .7 | 1.7 | 3.3 | 2.6 | 1.6 | 1.7 | 3.8 |
| 3 | Percent by volume | 19.3 | 23.5 | 22.1 | 19.6 | 18.7 | 20.6 | 20.8 | 18.6 | 24.5 |
| | Standard error | .2 | .2 | 1.3 | 1.2 | .3 | 1.3 | 2.5 | 1.5 | 1.9 |
| 5 | Percent by volume | 20.7 | 25.7 | 21.7 | 15.9 | 16.6 | 19.9 | 20.0 | 18.3 | 20.9 |
| | Standard error | 1.7 | 3.0 | 2.0 | .3 | .1 | 1.7 | 1.0 | 2.0 | 1.8 |
| 15 | Percent by volume | 17.5 | 21.6 | 17.8 | 14.0 | 14.5 | 15.1 | 15.6 | 12.1 | 16.0 |
| | Standard error | .7 | .4 | .6 | .3 | .2 | .1 | .7 | 1.2 | 1.0 |

## Elliott silt loam

Location: T33N R9E Sec. 1 NE 1/4, NE 1/4, Will County, Illinois (Dec. 1964)
Slope: 2 percent Vegetation: Prairie grass Drainage: Imperfect

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Black (10YR 2/1) light silty clay loam; moderate, fine to medium granular structure; firm; pH 7.0; abrupt, smooth boundary. |
| 8-12 | A1 | Black (10YR 2/1) light silty clay loam; moderate medium granular structure; firm; pH 6.0; clear, smooth boundary. |
| 12-15 | IIB1 | Very dark grayish-brown (10YR 3/2) silty clay loam with few, fine to medium, faint, dark grayish-brown (10YR 4/2) mottles; moderate fine to very fine subangular blocky structure; firm; pH 5.8; clear, smooth boundary. |
| 15-22 | IIB2 | Mixed dark grayish-brown and brown (10YR 4/2 + 4/3) silty clay with many fine, faint, dark gray (10YR 4/1) mottles; moderate medium prismatic, breaking to fine and medium subangular and angular blocky structure with very dark gray (10YR 3/1) and very dark grayish-brown (2.5Y 3/2) continuous clay coatings; firm; pH 6.0; many fine iron-manganese concretions; clear, smooth boundary. |
| 22-29 | IIB3 | Mixed dark grayish-brown and brown (10YR 4/2 + 4/3) silty clay with common fine, distinct, yellowish-brown (10YR 5/6 + 5/8) mottles; moderate medium subangular to angular blocky structure with very dark gray (10YR 3/1) discontinuous clay coatings; firm; pH 6.5; many fine iron-manganese concretions; abrupt, smooth boundary. |
| 29-35 | IIC1 | Mixed grayish-brown (2.5Y 5/2) and yellowish-brown (10YR 5/4) silty clay loam with few fine, distinct, strong brown (7.5YR 5/6 + 5/8) and dark gray (10YR 4/1) mottles; weak, medium to coarse angular blocky structure with grayish-brown (2.5Y 5/2) coatings; friable; calcareous; many fine iron-manganese concretions; clear, smooth boundary. |
| 35-48+ | IIC2 | Mixed grayish-brown (10YR 5/2 + 4/3) and brown (2.5Y 5/2) silty clay loam with few fine, prominent, strong brown (7.5YR 5/6) mottles; massive; firm; calcareous; many fine iron-manganese concretions. |

## Elliott silt loam physical data

### Particle Size Distribution

| Size | Value | 0-8" depth | 8-12" depth | 12-15" depth | 15-22" depth | 22-29" depth | 29-35" depth | 35-48" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 10.3 | 7.6 | 10.5 | 1.6 | 5.8 | 8.7 | 4.8 |
| | Standard error | 1.7 | .4 | .5 | .6 | .7 | .7 | 1.7 |
| Silt (50-2μ) | Percent | 57.3 | 61.5 | 51.7 | 55.1 | 52.0 | 62.4 | 63.7 |
| | Standard error | 1.1 | .9 | 1.4 | .1 | .8 | .7 | .9 |
| Clay (< 2μ) | Percent | 32.4 | 30.9 | 37.8 | 43.4 | 42.2 | 28.9 | 31.5 |
| | Standard error | .6 | .5 | 1.9 | .7 | 0 | .1 | .5 |

### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.06 | 1.46 | 1.34 | 1.64 | 1.82 | 1.91 | 1.71 |
| | Standard error | .02 | .02 | .02 | .03 | .10 | .08 | .04 |

### Moisture Content (moisture-release values)[a]

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| .1 | Percent by volume | 45.1 | 52.0 | 59.2 | 86.0 | 61.1 |
| | Standard error | .2 | 0 | .1 | .7 | .7 |
| .33 | Percent by volume | 35.5 | 46.3 | 50.0 | 71.0 | 49.0 |
| | Standard error | .2 | .2 | .1 | .4 | .1 |
| 1.0 | Percent by volume | 29.0 | 40.0 | 48.7 | 61.5 | 43.7 |
| | Standard error | .1 | .1 | .1 | .6 | .9 |
| 5.0 | Percent by volume | 21.2 | 31.5 | 37.7 | 49.2 | 35.9 |
| | Standard error | .1 | 0 | .1 | .2 | .2 |
| 15.0 | Percent by volume | 17.5 | 28.4 | b | b | 33.3 |
| | Standard error | .1 | .1 | | | .1 |
| | Percent by volume | 15.1 | 25.1 | 30.6 | 39.7 | 29.5 |
| | Standard error | .3 | .2 | .4 | .6 | .2 |

[a] Disturbed samples.
[b] Sample destroyed.

## Emmet loamy sand

Location: NE 1/4 or SE 1/4 of Section 36 T32N R6W, Charleroix County, Michigan (June, 1961)
Slope: 4 percent Vegetation: Corn Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Very dark grayish-brown (10YR 3/2) sandy loam; moderate fine granular structure; friable; moderately high organic matter content; slightly acid; clear, smooth boundary. |
| 8-12 | A2 | Brown (10YR 5/3) sandy loam; weak medium platy structure; friable; slightly acid; clear, wavy boundary. |
| 12-23 | Bhir | Dark yellowish-brown (10YR 4/4) sandy loam; weak medium subangular blocky structure; friable; slightly acid; clear, wavy boundary. |
| 23-35 | B2 | Brown (10YR 4/3) loam; moderate medium subangular blocky structure; friable; slightly acid; clear, wavy boundary. |
| 35+ | C | Brown (7.5YR 5/4) sandy loam; weak coarse subangular blocky structure; friable; calcareous. |

### Emmet loamy sand physical data

#### Particle Size Distribution

| Size | Value | 0-3" depth | 8-11" depth | 18-21" depth | 24-27" depth | 36-39" depth |
|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 80.8 | 82.6 | 82.4 | 90.0 | 87.5 |
| | Standard error | .86 | | | | |
| Silt (50-2μ) | Percent | 13.2 | 13.3 | 11.4 | 6.45 | 2.8 |
| | Standard error | 2.12 | | | | |
| Clay (< 2μ) | Percent | 6.0 | 4.1 | 6.2 | 3.55 | 9.7 |
| | Standard error | 2.20 | | | | |

#### Bulk Density (undisturbed samples)

| | | | | | | |
|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.471 | 1.503 | 1.556 | 1.630 | 1.665 |
| | Standard error | .096 | .029 | .050 | .034 | .024 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | |
|---|---|---|---|---|---|---|
| .01 | Percent by volume | 36.8 | 37.8 | 37.2 | 34.7 | 30.0 |
| | Standard error | 3.10 | 1.56 | 2.0 | 1.09 | 2.60 |
| .04 | Percent by volume | 32.6 | 33.6 | 24.8 | 19.0 | 19.0 |
| | Standard error | 2.34 | .92 | 2.55 | 1.87 | 1.05 |
| .06 | Percent by volume | 28.7 | 29.6 | 21.4 | 13.5 | 13.5 |
| | Standard error | 2.32 | .85 | 1.77 | .76 | 1.54 |
| .33 | Percent by volume | 24.3 | 26.7 | 17.6 | 9.9 | 9.4 |
| | Standard error | 3.76 | 1.15 | 1.22 | 1.48 | 1.83 |
| 15 | Percent by volume | 5.8 | 5.1 | 2.7 | 2.2 | 3.3 |

## Fayette silt loam

Location: SW 1/4, Sec. 12, T5N, R4W; Beetown township; Grant County, Wisconsin
Slope: 2 to 6 percent Vegetation: Grass and corn Sampled by: Carl Glocker (Aug. 1965)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-4 | A1 | Dark grayish-brown (10YR 4/2) silt loam; moderate fine granular structure; soft, very friable; medium acid; clear, wavy boundary. |
| 4-9 | A21 | Pale brown (10YR 6/3) silt loam; moderate, medium to fine platy structure; soft, very friable; strongly acid; clear, wavy boundary. |
| 9-12 | A22 | Brown (10YR 5/3) silt loam; weak coarse platy to weak medium granular structure; soft, very friable; strongly acid; abrupt, wavy boundary. |
| 12-19 | B1 | Yellowish-brown (10YR 5/4) heavy silt loam; moderate medium subangular blocky structure; slightly hard, friable; ped surfaces thickly coated with light gray; strongly acid; clear, wavy boundary. |
| 19-26 | B21 | Dark yellowish-brown (10YR 4/4) light silty clay loam; strong medium subangular blocky structure: hard, friable; peds coated with light gray; strongly acid; clear, wavy boundary. |
| 26-40 | B22 | Dark yellowish-brown (10YR 4/4) light silty clay loam; strong medium subangular blocky structure; hard, friable; ped faces lightly coated with light gray; strongly acid; clear, wavy boundary. |
| 40-50 | B3 | Yellowish-brown (10YR 5/4) light silty clay loam; few small, faint, strong brown (7.5YR 5/6) mottles; weak coarse subangular blocky structure; hard, friable; medium acid; clear, wavy boundary. |
| 50-65 | C1 | Yellowish-brown (10YR 5/4) silt loam; few small, faint, strong brown (7.5YR 5/6) mottles; massive; slightly hard, very friable; medium acid. |

## Fayette silt loam physical data

Particle Size Distribution

| Size | Value | 24" depth | 48" depth |
|---|---|---|---|
| Sand (>50μ) | Percent | 1.5 | 1.0 |
| Silt (50-2μ) | Percent | 66.5 | 71.0 |
| Clay (<2μ) | Percent | 32.0 | 28.0 |
| | | Bulk Density (undisturbed samples) | |
| | $g/cm^3$ | 1.47 | 1.59 |

## Flanagan silt loam

Location: T19W, R9E of 3 PM, Sec. 19, SW 160, NE 40, NW 10 Champaign County, Illinois (10/1/56)
Slope: 3/4 percent NE Vegetation: Tall prairie grass Drainage: Imperfect

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | A11 | Very dark gray to very dark brown (10YR 3/1 to 2/2 moist) friable silt loam; moderate medium crumb structure; gradual, smooth boundary. |
| 8-15 | A12 | Very dark brown to very dark gray (10YR 2/2 to 3/1 moist) friable to slightly firm silt loam; moderate, medium to coarse, granular to crumb structure; clear, smooth boundary. |
| 15-18 | A3 | Very dark grayish-brown (10YR 3/2 moist) slightly firm to friable fine silt loam to coarse silty clay loam; weak to moderate, very fine to fine subangular blocky structure; clear, smooth boundary. |
| 18-23 | B1 | Dominantly dark grayish-brown (96 percent 10YR 4/2 moist) silty clay loam with a few (2 percent) fine, faint, very dark grayish-brown (10YR 3/2 moist) and a few (2 percent) fine, faint, dark brown (10YR 4/3 moist) mottles; slightly firm to firm; moderate fine subangular blocky structure; light brownish-gray (10YR 6/2 moist) flecks and very dark grayish-brown (10YR 3/2 moist) organic matter coatings on surfaces of peds; clear, smooth boundary. |
| 23-32 | B2 | Dominantly dark grayish-brown (10YR 4/2 moist) firm silty clay loam with common (15 percent) fine, faint, brown to dark brown (10YR 5/3 to 4/3 moist) mottles; moderate to moderately strong medium subangular blocky structure; very dark grayish-brown (10YR 3/2 moist) organic matter coatings on ped surfaces; clear, smooth boundary. |
| 32-38 | B3 | Dominantly yellowish-brown (10YR 5/5 moist) slightly firm coarse silty clay loam with common fine, distinct, light yellowish-brown (10 percent 10YR 6/4 moist) and yellowish-brown (10 percent 10YR 5/6 moist) mottles; ped surfaces coated with prominent, very dark gray (10YR 3/2 moist) organic matter; weak, medium to coarse subangular blocky structure; clear, wavy boundary. |
| 38-45 | B3 (C1) | Dominantly yellowish-brown (10YR 5/7 moist) friable silt loam with many (40 percent) medium, prominent, light brownish-gray to brown (10YR 6/2 to 5/3 moist) mottles; nearly massive; many fine pinholes or vesicles and some worm channels partly filled with organic matter; abrupt, wavy boundary. |
| 45-49 | B3 (D1) | Dominantly yellowish-brown to light olive-brown (10YR 5/4 to 2.5Y 5/4 moist) slightly firm loam to possibly silt loam with common (10 percent) fine to medium, distinct, light brownish-gray (10YR 6/2 moist) mottles; massive; dominantly noncalcareous loam till except around limestone pebbles; some mixing of loess especially in upper part of horizon; abrupt, wavy boundary. |
| 49-58+ | C (D2) | Dominantly light olive-brown (85 percent 2.5Y 5/4 moist) calcareous loam till with common (10 percent) fine, distinct, light brownish-gray (10YR 6/2 moist) and common (5 percent) fine, distinct, yellowish-brown (10YR 5/6 moist) mottles; massive, compact, and slightly firm. |

## Flanagan silt loam physical data

### Particle Size Distribution

| Size | Value | 0-8" depth | 8-14" depth | 14-17" depth | 17-23" depth | 23-27" depth | 27-38" depth | 38-45" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 7.4 | 9.5 | 3.3 | 6.0 | | 6.4 | 8.6 |
| | Standard error | .9 | .1 | 1.2 | .6 | | 2.1 | --- |
| Silt (50-2μ) | Percent | 67.8 | 61.9 | 66.2 | 57.6 | | 67.2 | 65.8 |
| | Standard error | .1 | .5 | 1.2 | 1.4 | | 1.2 | --- |
| Clay (< 2μ) | Percent | 24.8 | 28.5 | 30.6 | 36.4 | | 26.4 | 25.6 |
| | Standard error | 1.0 | .6 | 0 | .8 | | 1.0 | --- |
| | | | | Bulk Density (undisturbed samples) | | | | |
| | $g/cm^3$ | 1.21 | 1.22 | 1.24 | 1.30 | 1.34 | 1.41 | 1.55 |
| | Standard error | .08 | .02 | ---- | .03 | .06 | .01 | ---- |
| | | | | Moisture Content (moisture-release values)[a] | | | | |
| Bars tension | | | | | | | | |
| .10 | Percent by volume | 42.8 | 38.4 | 40.6 | 47.0 | | 47.4 | 37.4 |
| | Standard error | .1 | .4 | .3 | .6 | | 0 | .8 |
| .33 | Percent by volume | 39.8 | 35.0 | 40.0 | 42.6 | | 40.4 | 31.1 |
| | Standard error | .2 | .2 | .1 | .5 | | .5 | .3 |
| 1.00 | Percent by volume | 27.0 | 30.9 | 31.8 | 30.4 | | 27.2 | 24.7 |
| | Standard error | .1 | .3 | .9 | .2 | | .1 | .1 |
| 3.00 | Percent by volume | 24.3 | 25.5 | 26.5 | 28.0 | | 22.4 | 14.6 |
| | Standard error | .4 | .4 | .2 | 0 | | .1 | .6 |
| 5.00 | Percent by volume | 22.1 | 23.6 | 24.6 | 25.6 | | 21.8 | 14.1 |
| | Standard error | .2 | .6 | .1 | ---- | | .3 | .3 |
| 15.00 | Percent by volume | 18.5 | 20.3 | 21.8 | 22.2 | | 18.3 | 12.2 |
| | Standard error | .3 | .3 | .1 | .1 | | .1 | 0 |

[a]Disturbed samples.

## Grundy silt loam

Location: T 70 N., R 28 W., Sec. 35, NW 160, SW 40, SE 10 Acres, Ringgold County, Iowa (8/6/63)
Slope: 1 percent Vegetation: Corn Drainage: Low imperfect

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-7 | Ap | Very dark gray (10YR 3/1) friable to firm heavy silt loam; fine moderate granular structure; abrupt, smooth boundary. |
| 7-12 | A3 | Very dark gray (10YR 3/1) firm silty clay loam with few fine, prominent, yellowish-brown (10YR 5/8) mottles; fine strong granular structure; clear, smooth boundary. |
| 12-18 | B1 | Dark gray to very dark gray (10YR 3.5/1) firm heavy silty clay loam with many fine, prominent, yellowish-brown (10YR 5/8) mottles and common fine, prominent, black (7.5YR 2/1) iron and manganese concretions; medium very strong granular to fine very strong subangular blocky structure; clear, smooth boundary. |
| 18-25 | B21 | Dark gray (10YR 4/1) firm silty clay with many medium, prominent, yellowish-brown (10YR 5/8) mottles; thick discontinuous very dark gray (10YR 3/1) clay and organic coatings on ped surfaces and black (10YR 2/1) fillings in pores; fine strong subangular block structure; clear, smooth boundary. |
| 25-37 | B22 | Grayish-brown (2.5Y 5/2) firm silty clay with many medium, distinct, yellowish-brown (10YR 5/6) and many fine prominent, yellowish-brown (10YR 5/8) mottles; thin discontinuous very dark gray (10YR 3/1) clay and organic streaks on vertical ped surfaces and black (10YR 2/1) organic fillings in pores; medium moderate blocky to subangular blocky structure; strong vertical cleavages; clear, smooth boundary. |
| 37-60 | B3 | Grayish-brown (2.5Y 5/2) firm heavy silty clay loam with many to common medium, distinct, yellowish-brown (10YR 5/6) and many fine, prominent, yellowish-brown (10YR 5/8) mottles; thin discontinuous very dark gray (10YR 3/1) clay and organic streaks on vertical ped surfaces and thin black (10YR 2/1) organic coatings in pores; medium weak blocky to massive structure. |

Note: Small manganese and iron concretions throughout the profile--few in surface horizon and maximum amount in B21 horizon. Pores common to 60 inches, with maximum porosity in the B1 horizon.

## Grundy silt loam physical data

### Particle Size Distribution

| Size | Value | 3-6" depth | 9-12" depth | 15-18" depth | 22-25" depth | 30-33" depth | 41-44" depth | 57-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 3.0 | 3.6 | 4.0 | 2.8 | 3.0 | 1.6 | 1.3 |
| | Standard error | .05 | .05 | .05 | 0 | .15 | .05 | 0 |
| Silt (50-2μ) | Percent | 70.3 | 67.8 | 59.3 | 49.2 | 53.0 | 58.0 | 63.7 |
| | Standard error | .05 | .800 | .450 | .350 | 0 | 1.15 | 2.05 |
| Clay (< 2μ) | Percent | 26.7 | 28.6 | 36.7 | 48.0 | 44.0 | 40.4 | 35.0 |
| | Standard error | 0 | .75 | .50 | .35 | .15 | 1.2 | 2.05 |

### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.33 | 1.35 | 1.38 | 1.40 | | 1.49 | 1.46 |
| | Standard error | .015 | .006 | .000 | .017 | | .010 | |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .1 | Percent by volume | 40.8 | 45.2 | 45.9 | 48.8 | | 47.8 | 51.8 |
| | Standard error | .35 | .25 | .20 | .15 | | .65 | 1.05 |
| .33 | Percent by volume | 34.6 | 39.4 | 36.0 | 44.8 | | 41.6 | 42.8 |
| | Standard error | .75 | .15 | .30 | .35 | | .25 | .15 |
| 1.0 | Percent by volume | 30.4 | 31.6 | 33.4 | 41.4 | | 39.0 | 37.8 |
| | Standard error | .20 | .40 | .25 | .25 | | .05 | .35 |
| 3.0[a] | Percent by volume | 25.8 | 25.2 | 28.0 | 38.4 | 38.8 | 38.4 | 34.8 |
| | Standard error | .05 | 0 | .15 | .20 | .20 | .25 | .15 |
| 5.0[a] | Percent by volume | 22.9 | 22.6 | 26.3 | 37.2 | 35.6 | 34.6 | 31.1 |
| | Standard error | 0 | .20 | .20 | .45 | .15 | .15 | .10 |
| 15.0[a] | Percent by volume | 17.8 | 18.2 | 22.2 | 33.2 | 31.0 | 27.4 | 25.2 |
| | Standard error | .15 | .15 | .15 | .35 | .75 | 0 | .80 |

[a]Disturbed samples.

## Holdrege silt loam

Location: North Platte, Lincoln County, Nebraska
Slope: 2 to 6 percent Vegetation: Corn and bromegrass Drainage: Good
Sampled by Darrell Smika (8/18/64)

| Depth (in.) | Horizon | |
|---|---|---|
| 0-5 | A1p | Dark gray silt loam; weak thick platy, breaking to weak fine granular structure. |
| 5-16 | A1z | Dark grayish-brown silt loam; weak medium subangular blocky structure. |
| 16-28 | B2 | Grayish-brown light silty clay loam; moderate medium and fine. |
| 28-35 | B3 | Very pale brown light silty clay loam; moderate medium and fine subangular blocky structure. |
| 35-39 | C1 | Very pale brown silt loam; very weak coarse prismatic, very weak medium and fine subangular structure. |
| 39-60 | Cca | Very pale brown; massive; strongly calcareous. |

### Holdrege silt loam physical data (corn)

Particle Size Distribution

| Size | Value | 0-5" depth | 5-16" depth | 16-28" depth | 28-35" depth | 35-60" depth |
|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 32.6 | 27.4 | 34.3 | 23.4 | 34.7 |
| Silt (50-2μ) | Percent | 44.1 | 46.8 | 39.9 | 41.0 | 43.1 |
| Clay (< 2μ) | Percent | 23.3 | 25.8 | 25.8 | 35.6 | 22.2 |

Bulk Density (undisturbed samples)

| | | | | | |
|---|---|---|---|---|---|
| $g/cm^3$ | 1.34 | 1.32 | 1.34 | 1.35 | |
| Standard error | .04 | .01 | .02 | .05 | |

Moisture Content (moisture-release values, percent by volume)[a]

| Bars tension | | | | | |
|---|---|---|---|---|---|
| .005 | 64.2 | 66.0 | 65.1 | 60.1 | 60.5 |
| .010 | 64.2 | 65.8 | 65.1 | 59.9 | 58.7 |
| .021 | 63.0 | 64.1 | 63.4 | 58.7 | 56.8 |
| .041 | 60.0 | 60.8 | 59.9 | 56.2 | 53.7 |
| .058 | 57.8 | 57.9 | 57.2 | 54.5 | 52.8 |
| .083 | 54.1 | 52.9 | 52.4 | 50.2 | 50.2 |
| .17 | 35.0 | 35.9 | 36.9 | 36.7 | 39.4 |
| .33 | 26.4 | 27.5 | 27.8 | 27.0 | 28.9 |
| .67 | 21.5 | 22.3 | 22.4 | 21.6 | 20.0 |
| 2.3 | 16.8 | 18.9 | 17.3 | 16.7 | 15.1 |
| 10.3 | 13.1 | 13.8 | 13.5 | 13.0 | 11.7 |
| 15.0 | 11.8 | 12.6 | 12.6 | 12.0 | 11.1 |

[a]One sample for each value.

### Holdrege silt loam physical data (bromegrass)

Particle Size Distribution

| Size | Value | 0-5" depth | 5-16" depth | 16-28" depth | 28-35" depth | 35-60" depth |
|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 28.0 | 32.0 | 34.4 | 24.9 | 21.0 |
| Silt (50-2μ) | Percent | 48.8 | 42.2 | 39.8 | 50.5 | 47.7 |
| Clay (< 2μ) | Percent | 23.2 | 25.8 | 25.8 | 24.6 | 31.3 |

Bulk Density (undisturbed samples)

| | | | | | |
|---|---|---|---|---|---|
| $g/cm^3$ | 1.45 | 1.30 | 1.36 | 1.34 | |
| Standard error | .03 | .01 | .04 | .02 | |

Moisture Content (moisture-release values)

Same as for corn conditions.

## Hoytville clay

Location: SW 1/4, NW 1/4, SW 1/4, Sec. 18, T3N, R10E Henry Twp., Wood County, Ohio
Slope: 0-1/2 percent Vegetation: Bromegrass-alfalfa Drainage: Very poor
Sampled by Rutledges, Volk, Flesher, and Urban (9/10/64)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-6 | Ap1 | Very dark grayish-brown (10YR 3/2) coarse clay; moderate medium subangular blocky structure; dry, hard; abundant fine roots; pH 6.5; abrupt, smooth boundary. |
| 6-9 | Ap2 | Dark grayish-brown (2.5Y 4/2) clay; strong medium and coarse angular blocky structure; dry, very hard; pH 6.7; abrupt, smooth boundary. |
| 9-14 | B21g | Dark grayish-brown (10YR 4/2) clay; weak fine prismatic in place, breaking to strong medium angular blocky structure; dry, very hard; many fine, distinct, dark yellowish-brown (10YR 3/4) mottles; pH 6.9; clear, wavy boundary. |
| 14-20 | B22g | Dark yellowish-brown (10YR 4/4) clay; moderate medium prismatic in place, breaking to strong medium angular and subangular blocky structure; dry, hard; few fine, faint, dark yellowish-brown (10YR 4/4) mottles; pH 7.0; clear, wavy boundary. |
| 20-29 | B23g | Olive-brown (2.5Y 4/4) clay with few fine, faint, grayish-brown (2.5Y 5/2) and many fine distinct, dark yellowish-brown (10YR 4/4) mottles; moderate coarse prismatic, breaking to strong fine prismatic, breaking to strong fine prismatic structure; dry, very hard; pH 7.3; clear, wavy boundary. |
| 29-49 | C1g | Olive-brown (2.5Y 4/4) clay; massive; dry, very hard; calcareous, effervesces strongly; gradual, smooth boundary. |
| 49-65 | C2g | Olive-brown (2.5Y 4/4) clay; massive; moist; very firm; calcareous, effervesces strongly. |

## Hoytville clay physical data

### Particle Size Distribution

| Size | Value | 2-5" depth | 10-13" depth | 16-19" depth | 22-25" depth | 30-33" depth | 42-45" depth |
|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 17.8 | 16.5 | 16.3 | 16.6 | 17.2 | 19.1 |
| | Standard error | .700 | .700 | .700 | .700 | .700 | .700 |
| Silt (50-2μ) | Percent | 39.0 | 39.2 | 38.2 | 40.0 | 40.3 | 42.0 |
| | Standard error | 1.170 | 1.176 | 1.146 | 1.200 | 1.209 | 1.260 |
| Clay (<2μ) | Percent | 43.2 | 44.3 | 45.5 | 43.4 | 42.5 | 38.9 |
| | Standard error | 1.296 | 1.329 | 1.365 | 1.302 | 1.275 | 1.167 |

### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.32 | 1.42 | 1.55 | 1.58 | 1.56 | 1.63 |
| | Standard error | .056 | .028 | .009 | .013 | .021 | .031 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 (Sat'd) | Percent by volume | 53.0 | 49.7 | 46.6 | 44.1 | 44.2 | 40.2 |
| | Standard error | .898 | .995 | .344 | .354 | .803 | .998 |
| .06 | Percent by volume | 42.0 | 40.8 | 39.2 | 38.1 | 36.8 | 34.5 |
| | Standard error | .511 | .333 | .182 | .312 | .304 | .460 |
| .33 | Percent by volume | 40.3 | 38.3 | 36.7 | 35.2 | 33.8 | 31.9 |
| | Standard error | .432 | .286 | .194 | .292 | .266 | .417 |
| 2.00 | Percent by volume | 38.2 | 33.1 | 30.8 | 33.8 | 32.7 | 30.3 |
| | Standard error | .572 | .352 | .328 | .435 | .253 | .513 |

## Ida silt loam

Location: T84N, R43W, Sec. 27, NE 160, NW 40, NW 10 Acres, Monona County, Iowa (7/17/63)
Slope: 2 percent Vegetation: Bromegrass sod Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-7 | Ap | Dark grayish-brown (10YR 4/2) very friable massive silt loam; abrupt, smooth boundary. |
| 7-20 | C1 | Brown (10YR 5/3) very friable massive silt loam with many fine, faint, light gray (10YR 6/1) and common medium faint, dark brown (10YR 3/3) mottles; clear, smooth boundary. |
| 20-60+ | C2 | Brown to yellowish-brown (10YR 5/3.5) very friable massive silt loam with common medium, distinct, light gray (10YR 6/1) and yellowish-brown (10YR 5/6) mottles, common fine, prominent, yellowish-brown (10YR 5/8) mottles, and common fine, prominent, black (10YR 2/1) manganese concretions. |
| Note: | | Common, medium to very coarse carbonate concretions in the Ap horizon, becoming few at 60 inches. Bromegrass roots common at 60 inches. |

### Ida silt loam physical data

#### Particle Size Distribution

| Size | Value | 3-6" depth | 9-12" depth | 20-23" depth | 41-44" depth | 58-61" depth |
|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 2.0 | 2.2 | 1.6 | 1.8 | 1.8 |
| | Standard error | .200 | 0 | .050 | .050 | .100 |
| Silt (50-2 μ) | Percent | 86.8 | 85.2 | 88.4 | 88.5 | 88.8 |
| | Standard error | .354 | 0 | .100 | .050 | 1.150 |
| Clay (< 2 μ) | Percent | 11.2 | 12.6 | 10.0 | 9.7 | 9.4 |
| | Standard error | .150 | 0 | .150 | .100 | 1.250 |

#### Bulk Density (undisturbed samples)

| | | | | | | |
|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.22 | 1.26 | 1.19 | 1.19 | 1.23 |
| | Standard error | .027 | .012 | .017 | .019 | .004 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | |
|---|---|---|---|---|---|---|
| .1 | Percent by volume | 37.4 | 41.4 | 44.0 | 46.2 | 47.2 |
| | Standard error | 1.049 | .639 | .650 | .750 | 0 |
| .33 | Percent by volume | 27.2 | 25.4 | 23.2 | 25.8 | 27.4 |
| | Standard error | .140 | .456 | .050 | .050 | .450 |
| 1.0 | Percent by volume | 19.4 | 15.8 | 15.3 | 16.3 | 17.4 |
| | Standard error | .150 | .250 | .100 | .100 | .350 |
| 3.0[a] | Percent by volume | 14.4 | 13.7 | 12.6 | 12.6 | 13.0 |
| | Standard error | .050 | 0 | .050 | .050 | 0 |
| 5.0[a] | Percent by volume | 12.9 | 12.1 | 11.4 | 11.4 | 11.6 |
| | Standard error | 0 | 0 | .050 | .100 | .050 |
| 15.0[a] | Percent by volume | 10.1 | 9.8 | 9.3 | 9.2 | 9.6 |
| | Standard error | .100 | .200 | .100 | .050 | .050 |

[a]Disturbed samples.

## Keith very fine sandy loam

Location: Alliance, Box Butte County, Nebraska
Slope: 2 to 6 percent Vegetation: Wheat and summer fallow Drainage: Good
Sampled by Charles Fenster (8/19/64)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-5 | A1P | Dark grayish-brown heavy very fine sandy loam; weak medium coarse subangular blocky structure. |
| 5-10 | A2 | Dark brown very fine sandy loam; weak coarse blocky structure; very friable, moist, soft. |
| 10-18 | B21 | Brown to dark brown very fine sandy loam; weak coarse prismatic to weak coarse subangular blocky structure. |
| 18-26 | B22 | Brown to dark brown light very fine sandy loam; weak coarse prismatic to weak medium subangular blocky structure. |
| 26-60 | C | Light gray to brown very fine sandy loam; weak coarse prismatic structure; effervesces with hydrochloric acid violently. |

### Keith very fine sandy loam physical data (black fallow)

Particle Size Distribution

| Size | Value | 0-10" depth | 10-26" depth | 26-48" depth |
|---|---|---|---|---|
| Sand (>50μ) | Percent | 53.4 | 56.3 | 51.2 |
| Silt (50-2μ) | Percent | 25.4 | 19.4 | 23.5 |
| Clay (<2μ) | Percent | 21.2 | 24.3 | 25.3 |

Bulk Density (undisturbed samples)

| | | | |
|---|---|---|---|
| $g/cm^3$ | 1.35 | 1.33 | 1.38 |
| Standard error | .02 | .02 | .07 |

Moisture Content (moisture-release values, percent by volume)[a]

| Bars tension | | | |
|---|---|---|---|
| .005 | 42.8 | 45.3 | 39.6 |
| .010 | 41.0 | 43.6 | 38.4 |
| .021 | 39.9 | 42.7 | 37.4 |
| .041 | 37.4 | 39.5 | 35.5 |
| .058 | 35.5 | 37.0 | 34.2 |
| .083 | 33.7 | 34.5 | 32.2 |
| .17 | 23.2 | 24.7 | 27.7 |
| .33 | 18.4 | 18.2 | 23.7 |
| .67 | 16.1 | 15.1 | 21.0 |
| 2.3 | 13.6 | 14.4 | 18.4 |
| 7.1 | 10.7 | 11.4 | 14.2 |
| 15.3 | 10.2 | 10.8 | 13.2 |

[a]One sample for each value.

### Keith very fine sandy loam physical data (intermediate wheatgrass)

Particle Size Distribution

| Size | Value | 0-10" depth | 10-26" depth | 26-48" depth |
|---|---|---|---|---|
| Sand (>50μ) | Percent | 62.7 | 60.1 | 44.1 |
| Silt (50-2μ) | Percent | 18.3 | 20.7 | 30.6 |
| Clay (< 2μ) | Percent | 19.0 | 19.2 | 25.3 |

Bulk Density (undisturbed samples)

| | | | |
|---|---|---|---|
| $g/cm^3$ | 1.57 | 1.41 | 1.35 |
| Standard error | .03 | .02 | .08 |

Moisture Content (moisture-release values)

Same as for fallow conditions.

## Kenyon silt loam

Location: F.W. Schaper farm, Kenyon; T108N R18W Sec. 19, Goodhue County, Minnesota
Slope: 2 percent south Vegetation: Corn Drainage: Moderately well drained Sampled by R.H. Rust, 1963

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-7 | Ap | Black silt loam; weak granular structure; moist, firm; pH 7.0; abrupt, smooth boundary. |
| 7-13 | A3 | Black to very dark gray silty clay loam; moderate fine granular structure; moist, friable; pH 6.5; clear, smooth boundary. |
| 13-24 | B2 | Olive-brown silty clay loam; moderate, fine to medium angular blocky structure; moist, friable to firm; pH 6.0; clear, smooth boundary. |
| 24-30 | B3 | Olive-brown to light olive-brown silty clay loam to clay loam; weak medium angular blocky; moist, friable; pH 6.1; gradual, smooth boundary. |
| 30-40 | C1 | Light olive-brown loam; moist, friable; pH 6.6; gradual, smooth boundary. |
| 40-48+ | C2 | Light olive-brown loam with common grayish-brown mottles; moist, firm; pH 7.0. |

Note: A few thin (less than ½-inch thick) seams of sandy loam in 40-48" zone; a few stones below 24".

## Kenyon silt loam physical data

### Particle Size Distribution

| Size | Value | 0-7" depth | 7-13" depth | 13-24" depth | 24-30" depth | 30-40" depth | 40-48" depth |
|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 12 | 9 | 10 | 19 | 43 | 46 |
| Silt (50-2μ) | Percent | 61 | 61 | 62 | 53 | 37 | 30 |
| Clay (< 2μ) | Percent | 27 | 30 | 28 | 28 | 20 | 24 |

### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.30 | 1.31 | 1.34 | 1.42 | 1.62 | 1.65 |
| | Standard error | .10 | .05 | .05 | .04 | .06 | .06 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| .33 | Percent by volume | 33.9 | 32.4 | 25.6 | 18.1 | 17.6 | 20.7 |
| 1 | Percent by volume | 24.1 | 21.2 | 18.9 | 11.4 | 12.4 | 15.9 |
| 2 | Percent by volume | 23.0 | 20.1 | 18.0 | 10.9 | 12.4 | 15.2 |
| 3 | Percent by volume | 22.8 | 19.8 | 15.9 | 10.2 | 11.0 | 13.5 |
| 15 | Percent by volume | 16.8 | 14.5 | 10.9 | 7.6 | 7.4 | 9.0 |

## Knik silt loam

Location: NW 1/4, SE 1/4, Sec 17, T17N, R1E of the Seward Meridian, Alaska (7/20/65)
Slope: 3 percent Vegetation: Spruce-birch forest Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 4-3½ | Aoo | Litter of leaves, needles, twigs. Not sampled. |
| 3½-0 | Ao | Very dark brown to very dark grayish-brown (10YR 2/2 to 3/2) mat of partially decomposed organic material; many very fine granules of very dark brown silt loam; few mycelia; abrupt, smooth boundary. |
| 0-3 | A2 | Gray (N 5/0) silt loam, mottled with reddish brown; weakly developed fine subangular blocky structure; friable; many roots in upper part of horizon, fewer in lower part; abrupt, wavy boundary. |
| 3-7 | BG | Mixed dark brown (10YR 3/3) and dark gray (5Y 4/1) silt loam, with small mottles of dark reddish brown; weakly developed medium subangular block structure; friable; few roots; few small manganese concretions; clear, wavy boundary. |
| 7-12 | CG1 | Gray (5Y 5/1) silt loam, mottled with dark yellowish brown; occasional horizontal streaks of very dark brown (10YR 2/2); massive, but breaks under pressure into poorly defined fine plates; friable; few roots; gradual boundary. |
| 12-19 | C2 | Mixed dark brown (10YR 4/3) and olive-brown (2.5Y 4/4) silt loam; streaks of very dark brown larger than in horizon above, some streaks of reddish yellow (7.5YR 6/6); massive, but friable; few roots; abrupt boundary. |
| 19-32+ | D | Well-packed coarse sand and gravel; yellow and brown grains predominate. |

## Knik silt loam physical data

### Particle Size Distribution

| Size | Value | 0-5" depth | 6-9" depth | 12-15" depth |
|---|---|---|---|---|
| Sand (>50μ) | Percent | 22.49 | 17.70 | 18.97 |
| | Standard error | 2.37 | 5.16 | 1.36 |
| Silt (50-2μ) | Percent | 73.78 | 77.00 | 76.65 |
| | Standard error | 4.32 | 5.21 | 1.27 |
| Clay (<2μ) | Percent | 3.83 | 5.13 | 4.40 |
| | Standard error | 1.00 | 2.52 | 1.16 |

### Bulk Density (undisturbed samples)

| | | | | |
|---|---|---|---|---|
| | $g/cm^3$ | .85 | .95 | .96 |
| | Standard error | .10 | .08 | .04 |

### Moisture Content (moisture-release values)

| Bars tension | | | | |
|---|---|---|---|---|
| .06 | Percent by volume | 51.1 | 51.9 | 45.9 |
| | Standard error | .88 | 1.02 | 1.13 |
| .08 | Percent by volume | 43.8 | 38.9 | 43.1 |
| | Standard error | .92 | 1.80 | 1.57 |
| .17 | Percent by volume | 38.7 | 39.5 | 44.5 |
| | Standard error | 2.06 | .29 | .84 |
| .33 | Percent by volume | 29.6 | 33.8 | 29.1 |
| | Standard error | 1.02 | 1.08 | .66 |
| .67 | Percent by volume | 23.4 | 22.6 | 20.9 |
| | Standard error | .73 | 1.14 | .40 |
| 2.31 | Percent by volume | 13.3 | 18.1 | 16.3 |
| | Standard error | .94 | .40 | .56 |
| 7.14 | Percent by volume | 10.2 | 11.4 | 13.1 |
| | Standard error | .54 | .43 | .60 |
| 15.00 | Percent by volume | 7.6 | 10.5 | 9.3 |
| | Standard error | .39 | .27 | .52 |

## Kranzburg silty clay loam

Location: N.E. Research Farm, Watertown, Codington County, South Dakota (July, 1963)
Slope: 1 to 2 percent Vegetation: Fallow Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | A1p | Black; weak fine granules; soft to slightly hard; friable. |
| 8-14 | B21 | Very dark grayish brown to dark brown; fine to coarse blocks. |
| 14-20 | B22 | Olive brown; medium and coarse prisms breaking to fragmentary blocks. |
| 20-28 | B23 | Olive brown; moderate coarse prisms; thin patchy clay films on ped faces. |
| 28-35 | B2ca | Olive brown; weak to moderate coarse prisms; moderately calcerous. |
| 35-45 | IIC1ca | Light olive brown; coarse prisms breaking to medium blocks; lime. |
| 45-60 | IIC2ca | Light olive brown; coarse prisms breaking to medium blocks; calcareous. |

## Kranzburg silty clay loam physical data

### Particle Size Distribution

| Size | Value | 0-8" depth | 8-14" depth | 14-20" depth | 20-28" depth | 28-36" depth | 36-45" depth | 45-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 1.8 | 21.3 | 19.2 | 20.9 | 51.2 | 32.8 | 35.6 |
| | Standard error | .2 | 2.1 | .2 | 2.2 | 4.1 | 0 | .8 |
| Silt (50-2μ) | Percent | 69.1 | 51.9 | 51.0 | 51.5 | 29.5 | 37.9 | 37.8 |
| | Standard error | .4 | .5 | .1 | 2.3 | 3.2 | 0 | 0 |
| Clay (< 2μ) | Percent | 29.1 | 27.9 | 29.7 | 27.6 | 19.3 | 29.3 | 26.6 |
| | Standard error | .6 | .5 | .3 | .1 | 1.1 | 0 | .7 |

### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.08 | 1.16 | 1.26 | 1.28 | 1.34 | 1.66 | 1.71 |
| | Standard error | .05 | .01 | .02 | .05 | .04 | .07 | .05 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1/10 | Percent by volume | 55.0 | 57.2 | 52.5 | 49.9 | 39.7 | 45.5 | 41.2 |
| | Standard error | 3.5 | 2.1 | .8 | 2.8 | 2.4 | 1.0 | 3.3 |
| 1/3 | Percent by volume | 50.9 | 55.0 | 50.1 | 49.3 | 38.3 | 43.5 | 39.5 |
| | Standard error | 2.6 | 2.3 | .9 | 3.0 | 2.2 | .5 | 3.5 |
| 1 | Percent by volume | 47.0 | 50.7 | 47.3 | 45.7 | 37.8 | 42.7 | 38.1 |
| | Standard error | 2.0 | 2.2 | .5 | 2.5 | 2.4 | 1.2 | 3.2 |
| 3 | Percent by volume | 20.7 | 21.0 | 20.4 | 18.4 | 13.1 | 22.6 | 23.4 |
| | Standard error | .2 | .5 | .2 | .7 | .8 | 1.0 | 2.2 |
| 5 | Percent by volume | 17.5 | 17.5 | 18.0 | 16.9 | 10.5 | 19.9 | 20.7 |
| | Standard error | .1 | .2 | .6 | .7 | 1.5 | 1.0 | 2.2 |
| 15 | Percent by volume | 15.9 | 17.1 | 15.8 | 14.6 | 9.4 | 15.8 | 18.1 |
| | Standard error | .1 | .5 | .3 | .6 | .5 | .8 | 2.1 |

## Miami sandy loam

Location: NW ¼ of NE ¼ Section 31 T4N R1W, Ingham County, Michigan (June, 1961)
Slope: 2 percent Vegetation: Corn Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-9 | Ap | Yellowish-brown (10YR 3/2 moist, 10YR 6/2 dry) sandy loam; weak medium granular; soft when dry, friable when moist; neutral with many roots. |
| 8-12 | A2 | Moderate yellowish-brown (10YR 5/4 moist, 10YR 8/2 dry) loam; weak medium granular; slightly hard when dry, friable when moist; slightly acid with many roots. |
| 12-21 | B21 | Moderate yellowish-brown (10YR 4/4 moist, 10YR 6/4 dry) loam; moderately medium blocky; hard when dry, friable when moist, medium acid with few roots. |
| 21-33 | B22 | Moderate yellowish-brown (10YR 4/4 moist, 10YR 6/4 dry) silt loam; moderate medium blocky; slightly hard when dry, friable when moist; slightly acid with few roots. |
| 35-39 | C | Moderate yellowish-brown (10YR 5/3 moist, 10YR 7/3 dry) loam; moderate coarse blocky structure; slightly hard when dry, friable when moist; mildly alkaline with few roots. |

## Miami sandy loam physical data

### Particle Size Distribution

| Size | Value | 0-3" depth | 9-12" depth | 18-21" depth | 24-27" depth | 36-39" depth |
|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 53.5 | 38.7 | 37.1 | 29.65 | 46.1 |
| | Standard error | 10.63 | | | | |
| Silt (50-2μ) | Percent | 32.1 | 43.3 | 48.75 | 52.4 | 30.7 |
| | Standard error | 6.46 | | | | |
| Clay (< 2μ) | Percent | 14.4 | 18.0 | 14.15 | 17.95 | 23.2 |
| | Standard error | 4.17 | | | | |
| | | Bulk Density (undisturbed samples) | | | | |
| | $g/cm^3$ | 1.394 | 1.450 | 1.375 | 1.402 | 1.512 |
| | Standard error | .13 | .053 | .056 | .13 | .10 |
| | | Moisture Content (moisture-release values) | | | | |
| Bars tension | | | | | | |
| .01 | Percent by volume | 37.7 | 38.5 | 39.6 | 39.9 | 38.9 |
| | Standard error | 2.72 | .70 | 1.78 | 3.20 | 1.18 |
| .06 | Percent by volume | 31.5 | 34.7 | 35.8 | 36.3 | 35.9 |
| | Standard error | 2.04 | .93 | 1.35 | 1.99 | 2.63 |
| .33 | Percent by volume | 29.6 | 33.7 | 34.5 | 35.7 | 35.8 |
| | Standard error | 2.15 | .97 | 1.15 | 1.71 | 2.63 |
| 15[a] | Percent by volume | 7.9 | 10.2 | 10.2 | 11.0 | 12.3 |
| | Standard error | 1.95 | | | | |

[a]Disturbed samples.

## Minto silt loam

Location: Fairbanks, Alaska (1963-1965)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 4-3 | Aoo | Relatively unweathered mat of roots, moss, and forest litter; abrupt, smooth boundary. |
| 3-0 | Ao | Dark reddish-brown (5YR 2/2) mat of roots and partially decomposed organic materials; many mycelia; abrupt, smooth boundary. |
| 0-3 | A1 | Very dark grayish-brown (10YR 3/2) silt loam; weak fine granular structure; friable; roots plentiful; charcoal particles throughout horizon but mostly near the surface; clear, wavy boundary. |
| 3-7 | B(?) | Dark grayish-brown (2.5Y 4/2) silt loam with many large, distinct, dark yellowish-brown mottles and few dark streaks along old root channels near top of horizon; mottles have diffuse boundaries; weak medium subangular blocky structure, breaking to very weak very fine plates; many fine (<2mm) spherical pellets of silt loam, which crush to same color as matrix; very friable; few roots; clear, wavy boundary. |
| 7-15 | C1 | Dark grayish-brown (2.5Y 4/2) silt loam with few medium, faint, olive-brown mottles; moderate very fine platy structure; very friable; few roots; gradual boundary; 6 to 10 inches thick. |
| 15-30 | C2 | Dark grayish-brown (2.5Y 4/2) silt with many olive-brown horizontal streaks; moderate very fine platy structure; very friable; few to no roots. |

### Minto silt loam physical data

#### Particle Size Distribution

| Size | Value | 0-5" depth | 6-9" depth | 12-15" depth | 30-33" depth |
|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 19.10 | 15.51 | 18.78 | 20.05 |
| | Standard error | 2.00 | 5.45 | 3.63 | 2.72 |
| Silt (50-2 μ) | Percent | 74.08 | 76.37 | 75.64 | 76.06 |
| | Standard error | 2.62 | 6.92 | 3.97 | 2.81 |
| Clay (< 2 μ) | Percent | 6.82 | 7.92 | 5.59 | 3.89 |
| | Standard error | 1.31 | 1.58 | .28 | .53 |

#### Bulk Density (undisturbed samples)

| | | | | | |
|---|---|---|---|---|---|
| | $g/cm^3$ | .91 | 1.39 | 1.43 | 1.37 |
| | Standard error | .07 | .05 | .05 | .05 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | |
|---|---|---|---|---|---|
| .06 | Percent by volume | 44.2 | 41.4 | 41.7 | 40.6 |
| | Standard error | 1.5 | .56 | 1.08 | 1.48 |
| .08 | Percent by volume | 36.0 | 38.0 | 42.0 | 42.0 |
| | Standard error | 1.86 | 1.01 | .19 | .87 |
| .17 | Percent by volume | 35.5 | 33.2 | 38.2 | 41.5 |
| | Standard error | .66 | 1.30 | .82 | .99 |
| .33 | Percent by volume | 21.4 | 22.0 | 22.8 | 26.4 |
| | Standard error | 1.31 | 1.50 | 1.4 | 1.7 |
| .67 | Percent by volume | 18.7 | 17.3 | 18.0 | 18.4 |
| | Standard error | 1.06 | 1.46 | 1.60 | .28 |
| 2.31 | Percent by volume | 11.2 | 13.0 | 12.1 | 8.1 |
| | Standard error | .71 | 1.18 | .74 | .28 |
| 7.14 | Percent by volume | 8.8 | 7.7 | 8.0 | 7.9 |
| | Standard error | .76 | .12 | .99 | .59 |
| 15.00 | Percent by volume | 7.6 | 7.1 | 6.3 | 5.9 |
| | Standard error | .46 | .28 | .36 | .50 |

## Moody silt loam

Location: T98N, R45W, Sec. 20, NE 160, NE 40, NW 10 Acres, Lyon County, Iowa (6/23/63)
Slope: 4 to 5 percent Vegetation: Alfalfa border strip Drainage: Well-drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-5 | Ap | Very dark gray (10YR 3/1) firm massive silt loam; abrupt, smooth boundary. |
| 5-15 | A3 | Very dark grayish-brown (10YR 3/2) and dark brown (10YR 4/3) friable silt loam; medium moderate angular blocky structure; gradual, smooth boundary. |
| 15-23 | B1 | Dark brown (10YR 4/3) friable heavy silt loam with moderately thick continuous very dark grayish-brown (10YR 3/2) clay and organic films; coarse moderate subangular blocky structure; clear, smooth boundary. |
| 23-32 | B2 | Dark brown (10YR 4/3) friable light silt clay loam with thin continuous very dark grayish-brown (10YR 3/2) clay and organic films; fine to medium, moderate to strong prismatic structure, breaking to medium strong subangular blocky; clear, smooth boundary. |
| 32-52 | B3 | Brown (10YR 4/3) friable heavy silt loam with common medium, distinct, grayish-brown (10YR 5/2) and few fine, distinct, yellowish-brown (10YR 5/6) mottles; thin very dark grayish-brown (10YR 3/2) clay and organic coatings in root channels and pores; coarse weak subangular blocky structure; abrupt, wavy boundary. |
| 52-60+ | Cca | Brown (10YR 4/3) friable silt loam with many medium, distinct, gray (10YR 6/1) and common medium, distinct, yellowish-brown (10YR 5/6) mottles; common fine, prominent, reddish-black (2.5YR 2/1) manganese concretions; massive structure. |

### Moody silt loam physical data

#### Particle Size Distribution

| Size | Value | 2-5" depth | 9-12" depth | 20-23" depth | 28-31" depth | 41-44" depth | 57-60" depth |
|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 1.4 | 1.4 | 1.0 | 1.6 | 1.4 | 1.8 |
| | Standard error | .10 | 0 | .10 | .20 | .10 | .10 |
| Silt (50-2 μ) | Percent | 69.8 | 69.1 | 68.5 | 69.3 | 75.8 | 79.8 |
| | Standard error | .90 | .10 | 1.60 | .10 | | 1.85 |
| Clay (< 2 μ) | Percent | 28.8 | 29.5 | 30.5 | 29.1 | 22.8 | 18.4 |
| | Standard error | .75 | .10 | 1.50 | .10 | .10 | 1.75 |

#### Bulk Density (undisturbed samples)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.18 | 1.20 | 1.21 | 1.30 | 1.26 | 1.32 |
| | Standard error | .021 | .014 | .028 | .004 | .009 | .012 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | |
|---|---|---|---|---|---|---|---|
| .01 | Percent by volume | 40.3 | 37.1 | 33.1 | 38.7 | 43.1 | 46.6 |
| | Standard error | .316 | .130 | .130 | .532 | .480 | 0 |
| .33 | Percent by volume | 33.3 | 33.3 | 29.8 | 32.3 | 28.7 | 31.0 |
| | Standard error | 0 | .409 | .130 | .130 | .409 | .259 |
| 1.0 | Percent by volume | 25.5 | 28.5 | 24.8 | 25.2 | 20.9 | 25.1 |
| | Standard error | 0 | .342 | 0 | 0 | .259 | .182 |
| 3.0[a] | Percent by volume | 21.6 | 22.8 | 23.6 | 23.7 | 18.4 | 18.8 |
| | Standard error | .240 | .450 | .150 | 0 | .050 | .150 |
| 5.0[a] | Percent by volume | 19.0 | 19.5 | 21.0 | 21.5 | 16.6 | 17.1 |
| | Standard error | .100 | .100 | .300 | .200 | .200 | .100 |
| 15.0[a] | Percent by volume | 15.5 | 16.4 | 17.6 | 19.0 | 13.3 | 13.8 |
| | Standard error | .200 | 0 | .250 | .200 | .200 | .100 |

[a]Disturbed samples.

## Morton loam

Location: 1,029 ft. east, 100 ft. south of the west 1/4 corner, Section 29, T140N, R96W, Stark County, North Dakota
Slope: 4 to 5 percent south-east Vegetation: Corn Drainage: Well drained
Sampled by Fred Schroer, Guy E. Wilkinson, Benjamin Fernandez (7/25/63)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-5 | Ap | Very dark grayish-brown (10YR 3/2 moist) loam; weak fine blocky and moderate fine to very fine crumb structure; soft when dry, friable when moist, slightly plastic and slightly sticky when wet; moderate amount of roots; abrupt boundary. |
| 5-11 | B21 | Very dark grayish-brown (10YR 3/2 moist) clay loam; moderate medium blocky and weak prismatic structure; slightly hard, friable, slightly plastic and sticky; moderate amount of roots; gradual boundary. |
| 11-20 | B22 | Very dark grayish brown (10YR 3/2 moist) on ped surface to dark brown (moist) inside peds; moderate medium prismatic structure; friable, slightly plastic, slightly sticky; clay films on horizontal and vertical ped surfaces; moderate amount of fine roots; clear boundary. |
| 20-26 | B3 | Dark brown (10YR 3/3 moist) clay loam; weak medium prismatic structure; friable, slightly plastic, slightly sticky; patchy clay films on vertical surfaces; moderate amount of fine roots; clear boundary. |
| 26-36 | C1 | Dark grayish-brown (10YR 4/2 moist) light loam; weak coarse blocky structure; very friable; slightly plastic, nonsticky; a few rootlets; clear boundary. |
| 36-41 | CII | Mottled brown and dark brown (10YR 4/3 and 5/3 moist) silty clay loam; weak fine granular structure; friable, plastic, slightly sticky; moderately calcareous; abrupt boundary. |
| 41-49 | CIII | Black to very dark brown (10YR 2/1 to 2/2 moist) organic lignite material; soft, very friable; slightly calcareous; white specks of salt present; abrupt boundary. |
| 49-54 | CIVca | Mottled grayish-brown and yellowish-brown (10YR 5/2 and 5/4 moist, occurring in the ratio of 2 to 1) silty clay loam; moderate fine granular structure; firm, plastic, sticky; moderately calcareous with many streaks and threads of lime. |

### Morton loam physical data

#### Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 30.2 | 32.4 | 32.9 | 29.0 | 10.3 | 13.8 | 15.5 |
| | Standard error | 2.4 | 2.5 | 3.4 | 7.2 | 6.0 | 6.8 | 10.7 |
| Silt (50-2 μ) | Percent | 43.9 | 38.9 | 35.4 | 37.6 | 47.4 | 49.6 | 50.5 |
| | Standard error | 2.4 | 2.1 | 3.6 | 3.0 | 5.7 | 3.7 | 8.7 |
| Clay (< 2 μ) | Percent | 25.9 | 29.1 | 31.7 | 33.4 | 42.3 | 36.6 | 34.0 |
| | Standard error | .6 | .3 | .7 | 2.6 | 2.8 | 4.5 | 6.6 |

#### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.26 | 1.34 | 1.52 | 1.58 | 1.50 | 1.51 | 1.47 |
| | Standard error | .01 | .03 | .06 | .10 | .05 | .04 | .03 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1/10 | Percent by volume | 38.1 | 36.6 | 40.7 | 39.8 | 39.4 | 39.3 | 38.8 |
| | Standard error | .7 | .7 | 1.1 | .9 | 2.3 | 3.5 | 4.2 |
| 1/3 | Percent by volume | 29.7 | 29.2 | 33.6 | 36.5 | 33.9 | 32.8 | 30.4 |
| | Standard error | .5 | .5 | .7 | 1.2 | 2.8 | 3.4 | 4.1 |
| 1/2 | Percent by volume | 28.9 | 27.9 | 30.9 | 34.1 | 27.8 | 29.0 | 26.0 |
| | Standard error | .6 | .5 | .8 | 1.9 | .5 | 0 | 2.4 |
| 1[a] | Percent by volume | 26.3 | 25.6 | 30.1 | 30.2 | 25.4 | 27.0 | 23.1 |
| | Standard error | .7 | .5 | 1.4 | 1.2 | .3 | .2 | .5 |
| 5[a] | Percent by volume | 21.0 | 21.6 | 28.7 | 27.5 | 24.9 | 24.2 | 17.8 |
| | Standard error | 1.0 | .3 | 0 | 1.2 | 1.8 | 1.5 | .2 |
| 10[a] | Percent by volume | 20.0 | 19.2 | 25.5 | 24.0 | 24.6 | 22.2 | 16.9 |
| | Standard error | 1.7 | .1 | 2.5 | 3.7 | .3 | 0 | 2.5 |
| 15[a] | Percent by volume | 16.9 | 17.6 | 20.2 | 22.8 | 23.7 | 21.3 | 16.2 |
| | Standard error | .6 | .5 | .7 | 1.5 | 1.5 | .7 | .5 |

[a]Disturbed samples.

## Morton loam, clay substratum

Location: 79 ft. south, 1,029 ft. east of the west 1/4 corner; Section 29, 140N, R96W, Stark County, North Dakota
Slope: 3 to 4 percent south-east Vegetation: Crested wheatgrass Drainage: Well drained
Sampled by Fred Schroer, Guy E. Wilkinson, Benjamin Fernandez (7/25/63)

| Depth (in.) | Horizon | |
|---|---|---|
| 0-1 | A11p | Light brownish-gray (10YR 6/2) loam, dark grayish brown (10YR 3.6/2) when moist; weak fine platy structure; soft when dry, friable when moist; abrupt boundary. (This layer occurs as a surface mulch on most of the area under crested wheatgrass.) |
| 1-7 | A12p | Dark grayish-brown (10YR 4/2) loam, very dark brown (10YR 2/2) when moist; moderate fine blocky and crumb structure; soft when dry, friable when moist; abundant roots; clear boundary. |
| 7-22 | B2 | Very dark grayish-brown grading to dark grayish-brown at bottom of horizon (10YR 3/2 to 4/2) clay loam, very dark brown to very dark grayish brown when moist (10YR 2/2 to 3/2); moderate medium prismatic structure, breaking easily into fine and medium blocky; friable when moist, plastic and slightly sticky when wet; moderate clay films coating vertical and horizontal ped surfaces; abundant roots; gradual boundary. |
| 22-28 | B3 | Brown (10YR 5/3) clay loam, dark grayish brown (10YR 4/2) when moist; weak coarse prismatic structure; friable when moist, plastic and sticky when wet; some roots; clear boundary. |
| 28-33 | C | Brown (10YR 5/3 moist) silty clay; weak coarse prismatic structure; friable, plastic, sticky; a few roots; moderately calcareous; abrupt boundary. |
| 33-36 | CIIsa | Yellowish-brown (10YR 5/4 moist) silty clay; weak coarse prismatic structure; friable, plastic, sticky; moderately calcareous; moderate amounts of gypsum and salts; abrupt boundary. |
| 36-49 | CIIIsa | Gray and grayish-brown (10YR 5/1 and 5/2 moist) silty clay; massive; firm, plastic, sticky; common small nests of gypsum, salt crystals, or both; calcareous; abrupt boundary. |
| 49-51 | CIV | Yellowish-brown (10YR 5/6 moist) silt loam; massive; friable, slightly plastic, slightly sticky; slightly calcareous; abrupt boundary. |
| 51-53 | CV | Light brownish-gray and pale brown (10YR 6/2 and 6/3 moist) silty clay loam; massive, varved; firm, plastic, slightly sticky; slightly calcareous; abrupt boundary. |
| 53-60 | CVI | Black to dark reddish-brown (10YR 2/1 to 2.5YR 3/4 moist) soft lignite; noncalcareous. |

## Morton loam physical data

### Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 31.8 | 31.9 | 33.4 | 20.6 | 6.1 | 3.6 | 3.3 |
| | Standard error | .4 | .7 | .8 | 2.4 | .3 | .3 | 1.1 |
| Silt (50-2 μ) | Percent | 43.4 | 40.0 | 35.5 | 42.0 | 47.1 | 46.6 | 46.0 |
| | Standard error | 1.1 | .7 | .9 | 1.3 | .6 | 1.4 | 3.4 |
| Clay (< 2 μ) | Percent | 24.8 | 28.1 | 31.1 | 37.4 | 46.8 | 49.8 | 50.7 |
| | Standard error | 1.2 | .2 | 1.3 | 2.1 | 1.7 | 1.9 | 3.0 |

### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.32 | 1.42 | 1.64 | 1.59 | 1.47 | 1.39 | 1.26 |
| | Standard error | .03 | .09 | .01 | .02 | .02 | .03 | .06 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .1 | Percent by volume | 40.9 | 38.8 | 37.6 | 38.3 | 43.2 | 45.6 | 47.6 |
| | Standard error | 1.3 | .6 | .9 | 1.3 | 1.6 | .3 | 1.2 |
| .33 | Percent by volume | 32.7 | 31.7 | 35.4 | 35.8 | 39.7 | 41.7 | 41.0 |
| | Standard error | 1.2 | .6 | .7 | .6 | .7 | .7 | .7 |
| .5 | Percent by volume | 30.1 | 31.0 | 34.4 | 33.2 | 37.8 | 38.2 | 37.5 |
| | Standard error | .6 | .5 | .5 | 1.0 | 1.3 | .6 | .7 |
| 1[a] | Percent by volume | 27.5 | 28.8 | 32.0 | 31.6 | 34.5 | 33.4 | 33.4 |
| | Standard error | .7 | .6 | .6 | .6 | 1.0 | .5 | .5 |
| 5[a] | Percent by volume | 22.0 | 25.0 | 29.2 | 30.2 | 31.8 | 28.2 | 27.6 |
| | Standard error | 1.7 | 1.6 | 1.7 | 1.0 | 1.1 | .6 | .4 |
| 10[a] | Percent by volume | 20.1 | 23.7 | 27.7 | 28.6 | 27.0 | 23.9 | 24.8 |
| | Standard error | 1.0 | 1.2 | 1.0 | 1.5 | .2 | .7 | 1.0 |
| 15[a] | Percent by volume | 18.0 | 19.3 | 22.3 | 24.8 | 25.1 | 22.2 | 20.0 |
| | Standard error | .6 | .6 | .8 | .3 | 0 | .8 | .3 |

[a]Disturbed samples.

## Plainfield loamy sand

Location: NW 1/4, SW 1/4, Sec. 21, T19N, R8E, Hancock Township, Waushara County, Wisconsin
Slope: 0 to 1 percent Vegetation: Grass and corn Sampled by G.B. Lee (July, 1964)

| Depth (in.) | Horizon | Description |
|---|---|---|
| ½-0 | Aoo and Ao | Thin layer of oak, hazlenut, and grass leaves over black (10YR 2/1), well-decomposed mat of humus; pH 6.0. |
| 0-4 | A1 | Very dark grayish-brown (10YR 3/2) loamy sand; very weak medium granular structure; very friable when moist; plant roots plentiful; high organic matter content and abundant bleached quartz grains; pH 5.8; clear, wavy boundary. |
| 4-12 | B21cr | Dark brown (7.5YR 3/4) loamy sand; weak medium subangular blocky structure; very friable when moist; tree roots plentiful; pH 5.6; gradual, irregular boundary. |
| 12-21 | B22cr | Dark brown (7.5YR 4/4) loamy sand to medium sand; weak medium subangular blocky structure; very friable; thin band of cobbles 1 to 2" in diameter at top of horizon; tree roots plentiful; pH 5.7; clear, wavy boundary. |
| 21-28 | B3 | Dark brown (7.5YR 4/4) to strong brown (7.5YR 4/6) medium sand; very weak coarse subangular blocky structure; loose; pH 5.7; clear, wavy boundary. |
| 28-39 | C1 | Strong brown (7.5YR 4/6) medium sand with some fine gravels; very weak coarse platy structure to single grained; loose; pH 5.5; clear, wavy boundary. |
| 39-48 | C2 | Yellowish-brown (10YR 5/6) medium sand; single grained, few spots and streaks of dark brown (7.5YR 4/4); loose; pH 5.7; clear, wavy boundary. |
| 48-60 | C3 | Light yellowish-brown (10YR 6/4) medium sand with few fine gravel; single grained; loose; pH 5.7. |

## Plainfield loamy sand physical data

### Particle Size Distribution

| Size | Value | 0-8" depth | 8-24" depth | 24-34" depth | 34+" depth |
|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 87.0 | 94.5 | 98.75 | 99.0 |
| | Standard error | .58 | 1.19 | .47 | .58 |
| Silt (50-2 μ) | Percent | 7.00 | 2.25 | .25 | 0 |
| | Standard error | 2.64 | 0.85 | .25 | 0 |
| Clay (< 2 μ) | Percent | 6.00 | 3.25 | 1.00 | 1.00 |
| | Standard error | 2.30 | 1.49 | .98 | .58 |

### Bulk Density (undisturbed samples)

| | | | | | |
|---|---|---|---|---|---|
| | $g/cm^3$ | 1.65 | 1.55 | 1.61 | 1.63 |
| | Standard error | .14 | .063 | .025 | .032 |

### Moisture Content (moisture-release values)

| Bars tension | | | | | |
|---|---|---|---|---|---|
| 0 | Percent by volume | 42.5 | 41.5 | 39.0 | 40.5 |
| .02 | Percent by volume | 38.5 | 32.0 | 24.0 | 21.5 |
| .04 | Percent by volume | 29.0 | 21.0 | 12.0 | 9.0 |
| .08 | Percent by volume | 19.0 | 10.0 | 7.0 | 4.5 |
| .10 | Percent by volume | 16.0 | 8.0 | 5.0 | 3.5 |

## Port Byron silt loam

Location: Rosemount Field Station, Soils Experiment Area, T11ON, R19W, Sec. 10 NESE, Dakota County, Minnesota
Slope: 3 percent W Vegetation: Corn Drainage: Well drained
Sampled by R.H. Rust (1963)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Black to very dark brown silt loam; weak fine granular structure; moist, friable; abrupt, smooth boundary. |
| 8-15 | A1 | Black to very dark brown silt loam; moderate very fine subangular blocky structure; moist, friable; clear, smooth boundary. |
| 15-20 | A3 | Very dark grayish-brown to dark brown silt loam; moderate fine subangular blocky structure; moist, friable; clear, smooth boundary. |
| 20-30 | B2 | Dark brown to brown silt loam; moderate, fine to medium subangular blocky structure; moist, friable; clear, smooth boundary. |
| 30-37 | B3 | Dark grayish-brown to brown silt loam; weak, fine to medium subangular blocky; moist, friable; gradual, smooth boundary. |
| 37-48 | C1 | Dark yellowish-brown to brown silt to silt loam; moist, very friable; clear, smooth boundary. |
| 48-54+ | IIC1 | Light olive-brown to olive-brown clay loam; moist, friable; calcareous. |

### Port Byron silt loam physical data

#### Particle Size Distribution

| Size | Value | 0-8" depth | 8-15" depth | 15-20" depth | 20-30" depth | 30-37" depth | 37-48" depth | 48-54" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 30 | 26 | (27) | 28 | 27 | 10 | N.D. |
| Silt (50-2 μ) | Percent | 51 | 54 | (53) | 53 | 55 | 65 | |
| Clay (< 2 μ) | Percent | 19 | 20 | (19) | 19 | 18 | 25 | |

#### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.19 | 1.20 | 1.17 | 1.19 | 1.28 | 1.23 | N.D. |
| | Standard error | .04 | .06 | .04 | .04 | .05 | .05 | |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .33 | Percent by volume | 29.6 | 27.2 | 27.3 | 29.2 | 23.7 | 22.4 | N.D. |
| 1 | Percent by volume | 20.3 | 21.8 | 19.9 | 20.1 | 16.0 | 16.3 | |
| 2 | Percent by volume | 17.2 | 17.1 | 16.1 | 16.5 | 12.6 | 15.4 | |
| 3 | Percent by volume | 14.6 | 14.1 | 13.7 | 14.2 | 11.4 | 13.8 | |
| 4 | Percent by volume | 10.2 | 10.4 | 9.9 | 10.4 | 8.5 | 8.2 | |

## Russell silt loam

Location: N 1/2, NE 1/4 Sec. 3 T21N R8N, Warren County, Indiana (7/15/61)
Slope: 10 percent Vegetation: Cultivated Drainage: Well drained

| Depth (inches) | Horizon | Description |
|---|---|---|
| 0-7 | Ap | Brownish to grayish-brown smooth silt loam; low organic matter; moderate to weak medium granular structure; friable. |
| 7-11 | A2 | Pale brown to brown smooth silt loam; weak fine platy or moderate coarse granular structure; friable. |
| 11-18 | B1 | Yellowish-brown to dark brown smooth silty clay loam; moderate to strong fine subangular blocky structure; slightly firm when moist. |
| 18-28 | B21 | Dark brown or dark yellowish-brown smooth silty clay loam; moderate to strong medium blocky structure; firm when moist, slightly hard when dry. |
| 28-54 | B22 | Dark yellowish-brown to dark brown clay loam; moderate coarse subangular blocky structure; firm when moist, hard when dry; considerable grit and small rock fragments. |

## Russell silt loam physical data

Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-36" depth | 36-48" depth | 48-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (>50μ) | Percent | 10.4 | 7.2 | 9.6 | 28.3 | 37.9 | 53.4 | 41.4 |
| | Standard error | 1.13 | .57 | .69 | 10.2 | .84 | .89 | 3.67 |
| Silt (50-2μ) | Percent | 74.4 | 71.4 | 66.5 | 45.7 | 36.0 | 25.4 | 34.2 |
| | Standard error | 2.19 | 3.46 | .58 | 9.08 | .65 | .53 | 3.52 |
| Clay (<2μ) | Percent | 15.2 | 21.2 | 23.9 | 26.0 | 26.0 | 21.2 | 24.4 |
| | Standard error | 1.12 | 3.31 | .37 | 2.68 | .62 | .56 | .26 |

Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.29 | 1.34 | 1.31 | 1.49 | 1.65 | 1.60 | 1.63 |
| | Standard error | .006 | .016 | .005 | 0 | .073 | .085 | .010 |

Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Saturation | Percent by volume | 52.6 | 49.0 | 49.5 | 53.2 | 49.5 | 44.0 | 47.3 |
| | Standard error | .63 | .84 | .92 | 1.03 | .78 | .68 | .36 |
| .05 | Percent by volume | 39.3 | 37.0 | 35.1 | 37.7 | 37.2 | 30.9 | 36.7 |
| | Standard error | .43 | .18 | .25 | .92 | .57 | .64 | .46 |
| .10 | Percent by volume | 36.2 | 34.3 | 33.0 | 34.7 | 34.5 | 29.8 | 35.2 |
| | Standard error | .93 | .43 | .86 | .65 | .81 | .62 | 1.05 |
| .20 | Percent by volume | 33.9 | 32.2 | 31.3 | 32.6 | 32.7 | 28.3 | 33.3 |
| | Standard error | .88 | .86 | .43 | .99 | .68 | 1.25 | .64 |
| .50 | Percent by volume | 31.7 | 30.8 | 29.6 | 31.0 | 31.5 | 26.7 | 31.5 |
| | Standard error | .48 | .53 | .63 | 1.18 | .86 | .25 | .72 |
| 1.0[a] | Percent by volume | 24.9 | 26.7 | 27.2 | 29.4 | 27.2 | 22.2 | 29.5 |
| | Standard error | .28 | .38 | .29 | .42 | .46 | .51 | .46 |
| 3.0[a] | Percent by volume | 17.2 | 20.0 | 21.9 | 26.2 | 24.3 | 19.5 | 26.4 |
| | Standard error | .28 | .13 | .47 | .54 | .59 | .22 | .68 |
| 5.0[a] | Percent by volume | 13.4 | 16.2 | 18.6 | 23.1 | 22.1 | 18.1 | 23.5 |
| | Standard error | 1.10 | .13 | .18 | .54 | 0 | .80 | .59 |
| 10.0[a] | Percent by volume | 11.5 | 13.5 | 16.0 | 20.6 | 20.0 | 15.5 | 20.5 |
| | Standard error | .13 | .13 | .29 | .15 | .99 | 1.12 | 1.39 |
| 15.0[a] | Percent by volume | 10.2 | 11.4 | 14.5 | 18.8 | 18.3 | 14.4 | 18.9 |
| | Standard error | .18 | .18 | .29 | .54 | .23 | .35 | .23 |

[a]Disturbed samples.

## Sharpsburg silty clay loam

Location: Lincoln, Lancaster County, Nebraska
Slope: 2 to 8 percent Vegetation: Bromegrass and corn Drainage: Good
Sampled by John Elder (8/20/64)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | A1p | Very dark brown light silty clay loam, dark gray when dry; weak fine granular structure; friable; slightly acid; abrupt boundary. |
| 8-12 | A1z | Very dark brown medium silty clay loam with small dark grayish-brown pockets; weak very fine subangular blocky structure; friable; medium acid; gradual boundary. |
| 12-15 | B1 | Mixed very dark grayish-brown, brown, and very dark brown medium silty clay loam; moderate very fine subangular blocky structure; friable to firm; medium acid; gradual boundary. |
| 15-26 | B21 | Mixed dark brown, brown, and very dark gray heavy silty clay loam; moderate very fine subangular blocky structure; friable to firm; faint clay films on ped faces; strongly acid; gradual boundary. |
| 26-35 | B22 | Brown medium silty clay loam with few fine, distinct, strong brown and faint grayish-brown mottles; moderate fine subangular blocky structure; friable to firm; distinct patchy clay films on ped faces; few fine dark oxide concretions; strongly acid; gradual boundary. |
| 35-46 | B3 | Brown medium silty clay loam with common fine and medium, faint, grayish-brown and few fine, faint, yellowish-brown mottles; weak medium subangular blocky structure; friable to firm; many very fine dark oxide concretions; medium acid; gradual boundary. |

### Sharpsburg silty clay loam physical data (corn)

Particle Size Distribution

| Size | Values | 0-12" depth | 12-26" depth | 26-35" depth | 35-46" depth |
|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 12.4 | 7.8 | 9.0 | 6.8 |
| Silt (50-2 μ) | Percent | 49.8 | 50.1 | 46.7 | 46.5 |
| Clay (< 2 μ) | Percent | 37.8 | 42.1 | 45.3 | 46.7 |

Bulk Density (undisturbed samples)

| | | | | |
|---|---|---|---|---|
| | $g/cm^3$ | 1.38 | 1.51 | 1.60 |
| | Standard error | .02 | .03 | .04 |

Moisture Content (moisture-release values, percent by volume)[a]

| Bars tension | | | | |
|---|---|---|---|---|
| .005 | 71.0 | 84.5 | 84.6 | 89.0 |
| .010 | 69.7 | 81.3 | 79.2 | 87.3 |
| .021 | 67.1 | 73.9 | 67.9 | 77.3 |
| .041 | 63.0 | 67.0 | 63.6 | 70.8 |
| .058 | 61.2 | 64.6 | 60.9 | 68.4 |
| .083 | 56.8 | 62.3 | 58.4 | 65.7 |
| .17 | 51.9 | 53.8 | 50.9 | 59.0 |
| .33 | 47.2 | 49.7 | 46.9 | 55.6 |
| .67 | 34.4 | 42.4 | 39.6 | 47.2 |
| 2.3 | 25.3 | 31.6 | 35.3 | 36.1 |
| 7.1 | 18.6 | 23.4 | 24.6 | 29.4 |
| 15.3 | 16.8 | 21.4 | 24.2 | 27.0 |

### Sharpsburg silty clay loam physical data (bromegrass)

Particle Size Distribution

| Size | Value | 0-12" depth | 12-26" depth | 26-35" depth | 35-46" depth |
|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 10.2 | 7.6 | 7.5 | 6.1 |
| Silt (50-2 μ) | Percent | 52.0 | 47.2 | 48.6 | 49.7 |
| Clay (< 2 μ) | Percent | 37.6 | 46.2 | 43.9 | 44.2 |

Bulk Density (undisturbed samples)

| | | | | |
|---|---|---|---|---|
| | $g/cm^3$ | 1.38 | 1.51 | 1.60 |
| | Standard error | .02 | .03 | .04 |

Moisture Content (moisture-release values)

Same as for corn conditions.

[a]One sample for each value.

## Sinai silty clay loam

Location: U.S.D.A. Research Farm - Madison, Lake County, Wisconsin (July, 1963)
Slope: 1 to 2 percent Vegetation: Corn Drainage: Well drained

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-6 | A1P | Black; granular; friable. |
| 6-12 | B21 | Very dark brown; weak prismatic to fine blocky structure. |
| 12-18 | B22 | Very dark brown; prismatic and blocky structure. |
| 18-24 | B3ca | Olive brown; compound weak prismatic and blocky; calcareous. |
| 24-30 | C11ca | Dark grayish brown mottled with yellowish brown; fine blocky structure. |
| 30-36 | C12ca | Dark grayish-brown mottled; moderate fine blocky structure; calcareous. |
| 36-42 | C2 | Gray mottled with brown and yellowish brown; coarse platy and fine angular blocky structure; iron and lime concentrations. |
| 42-48 | C3 | Same as C2. |
| 48-60 | C4 | Same as C3. |

### Sinai silty clay loam physical data

#### Particle Size Distribution

| Size | Value | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth | 42-48" depth | 48-60" depth |
|---|---|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 15.4 | 23.5 | 29.9 | 49.6 | 32.9 | 27.4 | 22.3 | 53.5 | 39.7 |
| | Standard error | .3 | .9 | .4 | 0 | .9 | 4.4 | 3.7 | 1.7 | 7.5 |
| Silt (50-2 μ) | Percent | 48.6 | 41.3 | 36.1 | 18.4 | 36.4 | 41.9 | 47.4 | 23.6 | 33.0 |
| | Standard error | .2 | 1.2 | 2.1 | 0 | .1 | 2.1 | 2.1 | .5 | 7.2 |
| Clay (< 2 μ) | Percent | 36.0 | 35.2 | 34.0 | 32.0 | 30.6 | 30.7 | 30.3 | 22.9 | 27.3 |
| | Standard error | 0 | .3 | 1.6 | 0 | .9 | 2.3 | 1.5 | 1.2 | .3 |

#### Bulk Density (undisturbed samples)

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.21 | 1.17 | 1.46 | 1.52 | 1.31 | 1.40 | 1.40 | 1.45 | 1.42 |
| | Standard error | .02 | .02 | .09 | .16 | .03 | .03 | .05 | .03 | .03 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| .1 | Percent by volume | 57.7 | 56.5 | 49.6 | 45.9 | 43.5 | 47.7 | 47.9 | 47.0 | 46.6 |
| | Standard error | 1.7 | 1.3 | 3.4 | 2.6 | 2.7 | 2.4 | 4.4 | 1.1 | 2.6 |
| .33 | Percent by volume | 56.9 | 54.8 | 44.2 | 45.4 | 43.0 | 45.6 | 47.3 | 45.7 | 46.2 |
| | Standard error | 1.5 | 1.4 | 6.0 | 2.8 | 2.1 | 2.4 | 3.8 | .8 | 3.1 |
| 1 | Percent by volume | 52.0 | 50.2 | 43.9 | 45.9 | 38.5 | 43.1 | 45.4 | 42.9 | 44.4 |
| | Standard error | 1.2 | 2.4 | 5.4 | 1.6 | 2.0 | 1.6 | 3.0 | 1.0 | 2.6 |
| 3 | Percent by volume | 26.3 | 25.4 | 25.6 | 22.8 | 23.7 | 25.9 | 26.2 | 21.3 | 26.3 |
| | Standard error | .5 | .7 | 1.3 | 2.3 | .9 | 2.8 | 1.4 | 1.0 | 1.4 |
| 5 | Percent by volume | 23.5 | 22.0 | 26.3 | 22.5 | 19.3 | 25.8 | 21.7 | 19.4 | 22.7 |
| | Standard error | .2 | .4 | 2.8 | 3.6 | 1.2 | 2.0 | 2.3 | .8 | 2.7 |
| 15 | Percent by volume | 20.9 | 19.4 | 21.6 | 19.2 | 17.5 | 22.7 | 18.6 | 14.9 | 15.2 |
| | Standard error | 1.1 | .2 | 1.9 | 1.9 | 1.0 | 2.0 | .8 | .7 | 2.2 |

## Sims loam

Location: NW 1/4 of NW 1/4 Sec. 33, T9N, R3E, Saginaw County, Michigan (June, 1961)
Slope: 1 percent Vegetation: Corn Drainage: Poor

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-9 | Ap | Dark grayish-yellow-brown (10YR 2/2 moist, 10YR 5/1 dry) loam; strong medium granular structure; slightly hard when dry, friable when moist; slightly acid; abundant roots. |
| 9-21 | B1G | Grayish-yellow-brown (10YR 4/2 moist, 10YR 6/3 dry) loam; moderately fine blocky structure; hard when dry, firm when moist; neutral; many roots. |
| 21-37 | B2G | Light grayish-yellow-brown (10YR 6/3 moist, 2.5YR 7/4 dry) clay loam; moderate medium blocky structure; very hard when dry, very firm when moist; mildly alkaline; few roots. |
| 37-43 | C | Grayish-yellow-brown (10YR 5/3 moist, 10YR 7/3 dry) clay loam; massive structure; very hard when dry, firm when moist; mildly alkaline; few roots. |

### Sims loam physical data

#### Particle Size Distribution

| Size | Value | 0-3" depth | 9-12" depth | 18-21" depth | 24-27" depth | 40-43" depth |
|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 45.18 | 46.0 | 42.55 | 38.52 | 40.75 |
| | Standard error | 3.35 | | | | |
| Silt (50-2 μ) | Percent | 29.12 | 29.15 | 28.25 | 29.93 | 28.00 |
| | Standard error | 2.68 | | | | |
| Clay (< 2 μ) | Percent | 24.65 | 24.85 | 29.20 | 31.55 | 31.25 |
| | Standard error | 1.64 | | | | |

#### Bulk Density (undisturbed samples)

| | | | | | | |
|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.228 | 1.384 | 1.528 | 1.608 | 1.640 |
| | Standard error | .26 | .034 | .044 | .061 | .048 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | |
|---|---|---|---|---|---|---|
| .01 | Percent by volume | 45.5 | 44.2 | 39.1 | 38.2 | 39.7 |
| | Standard error | 2.41 | 1.00 | .63 | 1.15 | 1.02 |
| .06 | Percent by volume | 35.7 | 37.8 | 35.9 | 35.6 | 35.8 |
| | Standard error | 1.84 | .97 | .53 | .84 | .54 |
| .33 | Percent by volume | 34.1 | 35.6 | 34.7 | 34.3 | 34.0 |
| | Standard error | .60 | .86 | .55 | .89 | .49 |
| 15[a] | Percent by volume | 15.1 | 16.3 | 19.7 | 13.9 | 20.0 |

[a]Disturbed sample.

## Webster clay loam

Location: Lamberton Field Experiment Station T109N R37W Sec.16, W 1/2 of W 1/2 of SW 1/4; Sec. 17, SE 1/4; Redwood County, Minnesota
Slope: 0 percent Vegetation: Corn Drainage: Poor
Sampled by R.H. Rust (1964)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-9 | Ap | Black clay loam; irregular (cloddy) structure; hard, dry; abrupt, smooth boundary. |
| 9-16 | A1 | Black clay loam; weak to moderate medium prismatic, breaking to moderate fine subangular blocky structure; moist, friable; clear, smooth boundary. |
| 16-21 | A3 | Black to very dark gray clay loam; weak medium prismatic, breaking to moderate, fine to medium subangular blocky structure; moist, friable; gradual, wavy boundary. |
| 21-26 | B | Very dark gray to dark olive-gray clay loam; weak medium prismatic, breaking to weak to moderate fine subangular blocky; moist, friable; gradual, wavy boundary. |
| 26-34 | C1 | Olive-gray clay loam with common distinct olive mottles; weak, fine to medium subangular blocky structure; moist, friable; gradual, wavy boundary. |
| 34-44 | C1ca | Dark gray to gray loam with many small, distinct, light olive-brown mottles; many large (1-to 2-cm) areas of segregated lime; weak, fine to medium subangular blocky structure; moist, friable; gradual, wavy boundary. |
| 44-60 | C2 | Dark gray to gray loam with many prominent olive-brown mottles; common small areas of segregated lime; massive; moist, friable to firm; calcareous. |

### Webster clay loam physical data

#### Particle Size Distribution

| Size | Value | 0-9" depth | 9-16" depth | 16-21" depth | 21-26" depth | 26-34" depth | 34-44" depth | 44-60" depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 35.6 | 35.2 | 33.6 | 32.9 | 35.0 | 36.9 | 39.6 |
| Silt (50-2 μ) | Percent | 35.0 | 33.5 | 33.4 | 33.5 | 34.7 | 37.7 | 38.4 |
| Clay (< 2 μ) | Percent | 29.4 | 31.3 | 33.0 | 33.6 | 30.3 | 25.4 | 22.0 |

#### Bulk Density (undisturbed samples)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $g/cm^3$ | 1.35 | 1.55 | 1.58 | 1.62 | 1.63 | 1.67 | 1.73 |
| | Standard error | .06 | .06 | .05 | .04 | .04 | .04 | .04 |

#### Moisture Content (moisture-release values)

| Bars tension | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .10 | Percent by volume | 59.4 | 60.0 | 59.2 | 59.4 | 54.6 | 60.1 | 59.5 |
| .33 | Percent by volume | 42.0 | 47.3 | 45.6 | 43.6 | 37.6 | 42.0 | 43.6 |
| 1 | Percent by volume | 34.0 | 38.9 | 36.3 | 35.3 | 31.5 | 34.1 | 33.7 |
| 3 | Percent by volume | 28.9 | 33.8 | 31.9 | 30.6 | 27.1 | 26.5 | 26.6 |
| 5 | Percent by volume | 27.0 | 30.2 | 29.2 | 27.8 | 23.1 | 22.4 | 23.7 |
| 15 | Percent by volume | 22.5 | 27.0 | 25.1 | 23.6 | 19.9 | 19.1 | 18.8 |

## Withee silt loam

Location: NW 1/4, NW 1/4, Sec. 22, T25N, R3E, Marshfield Township, Wood County, Wisconsin
Slope: 0 to 2 percent Vegetation: Corn and grass Sampled by G.B. Lee (9/19/61)

| Depth (in.) | Horizon | Description |
|---|---|---|
| 0-8 | Ap | Dark grayish-brown (10YR 4/2) and very dark grayish-brown (10YR 3/2) silt loam; weak medium subangular blocky structure; friable; fine fibrous roots common; neutral; abrupt, smooth boundary. |
| 8-11 | A2 | Grayish-brown (10YR 5/2) silt to silt loam; weak thin platy structure; friable; common medium, prominent, yellowish-brown (10YR 5/6 to 5/8) mottles; very strongly acid; abrupt, smooth boundary. |
| 11-18 | AB | Pale brown (10YR 6/3) and light yellowish-brown (2.5Y 6/3) gritty, slightly pebbly, silt loam; weak medium prismatic structure displays weak coarse plates that break under slight pressure to weak fine and medium subangular blocks; friable; thick tongues of silt from A2 invade more than 50 percent of this horizon and exhibit light gray (10YR 7/2) colors where not mottled; often isolate remnants of B material; few patchy remnants of clay films on some blocky ped faces; many medium and large, distinct mottles of strong brown (7.5YR 5/2 to 5/8); very strongly acid; clear, wavy boundary. |
| 18-24 | BA | Pale brown (10YR 6/3) and light yellowish-brown (2.5Y 6/4) silt loam; weak medium prismatic structure, breaking under slight pressure to weak medium subangular blocks; friable; moderately thick light gray (10YR 7/2) tongues of bleached silt extend along prism faces, occupying about 25 percent of horizon; few patchy remnants of clay films on some blocky ped faces; many large, distinct, strong brown (7.5YR 5/6) mottles; very strongly acid; abrupt, wavy boundary. |
| 24-36 | B2 | Reddish-brown (5YR 4/3) pebbly and somewhat cobbly clay loam; weak and moderate coarse prismatic structure, breaking under disturbance to weak and moderate medium subangular blocks; firm; prism faces frequently dark brown (7.5YR 4/4); many patchy brown (7.5YR 5/2) clay films on prism and some blocky ped faces; infiltrations of powdery bleached silt cover clay films along many prism faces; common medium, distinct, yellowish-red (5YR 9/6) mottles; very strongly acid; gradual, smooth boundary. |
| 36-44 | B3 | Reddish-brown (5YR 4/3 to 5/3) clay loam somewhat coarser textured than B2; weak coarse subangular blocky structure; firm; common medium, distinct and prominent, yellowish-red (5YR 4/6) and brown (7.5YR 5/2) mottles; very strongly acid; gradual, smooth boundary. |
| 44-52 | C1 | Reddish-brown (5YR 4/4) clay loam glacial till interlaid with lenses of silty material; very weak coarse subangular blocky structure to generally massive; firm; few gray (5Y 5/1) clay flows in root and worm channels; few large, faint, yellowish-red (5YR 5/6) mottles; very strongly acid; gradual, smooth boundary. |
| 52-60 | C2 | Reddish-brown (5YR 4/4) generally massive clay loam glacial till; few large, faint, yellowish-red (5YR 5/6) mottles; very strongly acid. |

### Withee silt loam physical data

Particle Size Distribution

| Size | Values | 0-7" depth | 7-10" depth | 10-15" depth | 15-20" depth | 20-25" depth | 25-48" depth | 48"+ depth |
|---|---|---|---|---|---|---|---|---|
| Sand (> 50 μ) | Percent | 26.5 | 24.5 | 26.5 | 38.5 | 32.5 | 37.5 | 58.5 |
| Silt (50-2 μ) | Percent | 54.0 | 54.5 | 60.5 | 39.0 | 44.0 | 33.0 | 22.0 |
| Clay (< 2 μ) | Percent | 19.5 | 21.0 | 13.0 | 22.5 | 23.5 | 29.5 | 19.5 |

Moisture Content (moisture-release values)

| Bars tension | | | | | | |
|---|---|---|---|---|---|---|
| 0 | Percent by volume | 61 | | 52 | 50 | 43 |
| .02 | Percent by volume | 52 | | 49 | 39 | 36 |
| .04 | Percent by volume | 50 | | 48 | 38 | 35 |
| .08 | Percent by volume | 48 | | 47 | 37 | 34 |
| .10 | Percent by volume | 47 | | 45 | 36 | 32 |
| .33 | Percent by volume | 22 | | | | |
| 15.0 | Percent by volume | 7 | | | | |

## *APPENDIX C. ACCESSORY SOILS DATA FROM INITIAL AND WET INFILTRATION RUNS*

Because of variations in experiments and reports, not every soil will have the same kinds of data recorded for it. Data are given for the following soils according to crop cover conditions.

**Corn seedbed:**

| | |
|---|---|
| Bearden silty clay loam | North Dakota |
| Blount silty clay loam | Ohio |
| Canfield silt loam | Ohio |
| Cisne silt loam* | Illinois |
| Elliott silt loam | Illinois |
| Flanagan silt loam | Illinois |
| Grundy silt loam | Iowa |
| Holdrege silt loam | Nebraska |
| Hoytville clay | Ohio |
| Ida silt loam | Iowa |
| Keith very fine sandy loam | Nebraska |
| Moody silt loam | Iowa |
| Morton loam | North Dakota |
| Sharpsburg silty clay loam | Nebraska |
| Webster clay loam | Minnesota |

**Clipped bromegrass:**

| | |
|---|---|
| Bearden silty clay loam | North Dakota |
| Blount silty clay loam | Ohio |
| Canfield silt loam | Ohio |
| Cisne silt loam | Illinois |
| Dudley clay loam | South Dakota |
| Elliott silt loam | Illinois |
| Flanagan silt loam | Illinois |
| Grundy silt loam | Iowa |
| Holdrege silt loam | Nebraska |
| Hoytville clay | Ohio |
| Ida silt loam | Iowa |
| Keith very fine sandy loam | Nebraska |
| Kenyon silt loam | Minnesota |
| Kranzburg silty clay loam | South Dakota |
| Moody silt loam | Iowa |
| Morton loam | North Dakota |
| Port Byron silt loam | Minnesota |
| Sharpsburg silty clay loam | Nebraska |
| Sinai silty clay loam | South Dakota |
| Webster clay loam | Minnesota |

**Corn after cultivation:**

| | |
|---|---|
| Blount silty clay loam | Ohio |
| Canfield silt loam | Ohio |
| Cisne silt loam | Illinois |
| Dudley clay loam | South Dakota |
| Elliott silt loam | Illinois |
| Flanagan silt loam | Illinois |
| Hoytville clay | Ohio |
| Kenyon silt loam | Minnesota |
| Kranzburg silty clay loam | South Dakota |
| Morton loam | North Dakota |
| Port Byron silt loam | Minnesota |
| Sinai silty clay loam | South Dakota |

*Appendix Table 4. Accessory Data From Initial and Wet Infiltration Runs on Soils With Corn Seedbed Treatment*

Soil type: **Bearden silty clay loam (North Dakota)**

| Rep. | Moisture content, percent by volume 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth |
|---|---|---|---|---|---|---|---|
| Initial run antecedent moisture | | | | | | | |
| 1 | 40.1 | 39.9 | 36.8 | 35.8 | 36.3 | 41.7 | 44.6 |
| 2 | 38.8 | 35.9 | 35.0 | 34.8 | 35.2 | 35.0 | 41.0 |
| 3 | 38.6 | 38.2 | 37.1 | 33.3 | 34.5 | 36.6 | 39.1 |
| Moisture two days after wet run | | | | | | | |
| 1 | 42.5 | 36.8 | 36.8 | 37.0 | 38.3 | 39.7 | 42.8 |
| 2 | 43.1 | 36.5 | 36.2 | 37.1 | 35.8 | 41.0 | 42.2 |
| 3 | 42.7 | 38.1 | 37.5 | 34.4 | 37.0 | 36.6 | 42.6 |

| Aggregate stability of surface 3 inches | Replicates, duplicates 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 | Average |
|---|---|---|---|---|---|---|---|
| Mean wt. diameter, mm | .19 | .18 | .17 | .19 | .19 | .17 | .18±.004 |

Soil type: **Blount silty clay loam (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 73.5 | 65.5 | 67.5 | 19.7 | 24.6 | 36.5 | 31.8 | 33.3 | 41.8 | 43.9 |
| 1 | 2 | 76.0 | 72.0 | 70.0 | 28.8 | 31.8 | 35.6 | 40.4 | 43.4 | 46.1 | 41.7 |
| 2 | 1 | 70.0 | 71.5 | 72.0 | 13.7 | 21.6 | 31.7 | 33.1 | 29.1 | 28.1 | 26.7 |
| 2 | 2 | 79.0 | 78.5 | 74.5 | 19.8 | 27.3 | 33.8 | 39.3 | 38.3 | 37.5 | 33.6 |
| 3 | 1 | 67.0 | 65.5 | 66.5 | 18.3 | 22.6 | 31.2 | 32.8 | 38.2 | 34.0 | 36.3 |
| 3 | 2 | 69.5 | 74.5 | 73.5 | 15.5 | 23.1 | 31.6 | 32.2 | 35.7 | 34.9 | 33.8 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 68.5 | 62.0 | 64.0 | 41.4 | 33.5 | 34.1 | 34.2 | 38.9 | 40.3 | 48.0 |
| 1 | 2 | 76.0 | 74.0 | 74.5 | 42.1 | 38.5 | 39.1 | 37.6 | 43.2 | 45.2 | 48.2 |
| 2 | 1 | 62.5 | 63.0 | 66.0 | 41.9 | 38.5 | 38.3 | 35.8 | 30.6 | 29.7 | 32.2 |
| 2 | 2 | 76.5 | 73.5 | 73.5 | 36.9 | 34.3 | 39.2 | 38.6 | 43.2 | 38.7 | 39.7 |
| 3 | 1 | 63.0 | 65.0 | 70.5 | 30.4 | 27.9 | 34.6 | 40.2 | 38.7 | 34.4 | 37.0 |
| 3 | 2 | 69.0 | 69.5 | 69.5 | 40.2 | 39.3 | 39.6 | 40.5 | 38.2 | 38.3 | 39.1 |

Soil type: **Canfield silt loam (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 73.5 | 72.0 | 67.5 | 20.8 | 25.2 | 26.9 | 26.3 | 27.8 | 27.9 | 27.3 |
| 1 | 2 | 79.0 | 73.0 | 70.0 | 23.1 | 26.9 | 30.2 | 33.4 | 30.6 | 27.1 | 26.0 |
| 2 | 1 | 81.0 | 78.5 | 85.0 | 21.4 | 29.0 | 32.8 | 35.4 | 34.4 | 31.1 | 32.5 |
| 2 | 2 | 73.0 | 70.5 | 65.5 | 22.6 | 26.3 | 30.5 | 34.1 | | | |
| 3 | 1 | 76.0 | 75.0 | 75.5 | 19.2 | 26.0 | 29.5 | 33.3 | 32.6 | 28.3 | 29.6 |
| 3 | 2 | 84.5 | 74.5 | 64.0 | 18.0 | 25.2 | 31.2 | 34.5 | 36.8 | 37.9 | 28.0 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 68.0 | 69.5 | 71.5 | 28.3 | 26.3 | 27.5 | 25.6 | 27.1 | 25.2 | 25.4 |
| 1 | 2 | 72.0 | 73.0 | 81.0 | 25.5 | 26.4 | 30.8 | 30.0 | 31.2 | 26.6 | 28.9 |
| 2 | 1 | 68.5 | 69.5 | 67.5 | 29.2 | 27.6 | 29.1 | 27.7 | | | |
| 2 | 2 | 72.0 | 72.0 | 68.5 | 27.2 | 28.3 | 31.8 | 35.4 | | | |
| 3 | 1 | 75.5 | 74.5 | 69.5 | 28.2 | 28.2 | 32.3 | 28.2 | 32.3 | 29.9 | 26.5 |
| 3 | 2 | 78.5 | 73.0 | 66.5 | 30.6 | 30.8 | 35.5 | 37.9 | 33.1 | 38.2 | 29.8 |

*Appendix Table 4 (continued).*

Soil type: **Cisne silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 80 | 82 | 86 | 13.6 | 17.9 | 19.1 | 16.7 | 30.9 | 26.3 | 19.1 | 18.2 |
| 1 | 2 | 97 | 82 | 82 | 13.2 | 17.6 | 17.8 | 19.2 | 33.4 | 29.7 | 26.8 | 20.1 |
| 2 | 1 | 92 | 79 | 82 | 13.8 | 19.1 | 19.8 | 18.9 | 33.6 | 31.1 | 22.6 | 19.5 |
| 3 | 1 | 81 | 72 | 73 | 17.4 | 19.6 | 19.8 | 15.8 | 22.4 | 21.9 | 21.6 | 26.5 |
| 3 | 2 | 79 | 75 | 73 | 17.6 | 19.9 | 22.3 | 20.1 | 28.2 | 23.9 | 21.6 | 20.3 |
| 4 | 1 | 77 | 73 | 73 | 15.3 | 20.4 | 20.0 | 17.9 | 25.6 | 25.8 | 22.6 | 18.0 |
| 4 | 2 | 78 | 66 | 73 | 14.5 | 18.7 | 20.1 | 21.5 | 26.9 | 21.8 | 19.9 | 17.1 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 82 | 78 | 82 | 22.9 | 21.7 | 20.9 | 20.3 | 30.5 | 26.5 | 24.8 | 23.0 |
| 1 | 2 | 88 | 82 | 85 | 24.2 | 22.9 | 21.9 | 21.9 | 34.9 | 32.7 | 27.7 | 22.4 |
| 2 | 1 | | 80 | | 25.5 | 23.7 | 24.0 | 21.6 | 32.9 | 27.0 | 24.4 | 23.1 |
| 3 | 1 | 81 | 73 | 75 | 22.8 | 22.4 | 24.9 | 24.1 | 26.3 | 24.1 | 24.2 | 25.4 |
| 3 | 2 | 75 | 74 | 76 | 23.5 | 23.6 | 23.7 | 21.9 | 22.7 | 24.9 | 27.4 | 24.9 |
| 4 | 1 | 73 | 68 | 70 | 21.0 | 21.0 | 22.2 | 19.9 | 25.9 | 23.3 | 24.3 | 18.8 |
| 4 | 2 | 71 | 68 | 72 | 23.2 | 20.7 | 22.0 | 20.9 | 23.8 | 23.1 | 21.2 | 20.0 |

| Bulk density, $g/cm^3$ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 3,1 | 3,2 | 4,1 | 4,2 |
|---|---|---|---|---|---|---|---|
| 2-5" depth | 1.28 | 1.22 | 1.23 | 1.31 | 1.39 | 1.22 | 1.28 |
| 12-15" depth | 1.34 | 1.31 | 1.34 | 1.31 | 1.39 | 1.39 | 1.40 |

Soil type: **Elliott silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 92 | 85 | 89 | 19.5 | 21.8 | 24.1 | 24.9 | 37.2 | 31.9 | 32.6 | 26.0 |
| 1 | 2 | 96 | 75 | 68 | 19.5 | 23.0 | 24.1 | 24.3 | 31.3 | 32.7 | 27.4 | 25.8 |
| 2 | 1 | 74 | 74 | 64 | 17.8 | 19.6 | 22.9 | 22.8 | 32.8 | 32.5 | 26.6 | 25.8 |
| 2 | 2 | 78 | 78 | 68 | | 20.8 | 23.3 | 24.5 | 34.0 | 31.2 | 29.9 | 29.1 |
| 3 | 1[a] | 75 | 69 | 72 | 16.2 | 19.5 | 20.5 | 21.1 | | | | |
| 3 | 2[a] | 77 | | 66 | | | | | | | | |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 81 | 81 | 81 | 35.8 | 33.9 | 31.8 | 29.2 | 35.9 | 36.3 | 33.5 | 27.3 |
| 1 | 2 | 87 | | 81 | 28.6 | 27.9 | 27.2 | 27.4 | | | | |
| 2 | 1 | 81 | 78 | 72 | 27.5 | 28.3 | 26.5 | 25.7 | 35.1 | 33.2 | 36.7 | 28.4 |
| 2 | 2 | 77 | 76 | 72 | 29.7 | 27.6 | 25.6 | 25.7 | 33.0 | 32.5 | 29.6 | 28.0 |

| Bulk density $g/cm^3$ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2[a] |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.09 | 1.21 | 1.15 | 1.01 | 1.06 | |
| 12-15" depth | 1.24 | 1.34 | 1.32 | 1.34 | 1.40 | |

[a]Runs not completed because of very heavy rain.

*Appendix Table 4 (continued).*

Soil type: **Flanagan silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 70 | 67 | 65 | 18.1 | 24.2 | 28.1 | 25.7 | 35.1 | 32.1 | 31.8 | 30.1 |
| 1 | 2 | 85 | 81 | 68 | 21.4 | 24.9 | 27.8 | 26.6 | 35.2 | 31.1 | 31.0 | 30.9 |
| 2 | 1 | 67 | 65 | 63 | 18.7 | 21.9 | 26.0 | 25.8 | 33.1 | 35.8 | 36.9 | 32.3 |
| 2 | 2 | 81 | | 77 | 26.5 | | | 27.0 | 41.5 | 40.2 | 32.4 | 31.3 |
| 3 | 1 | 70 | 70 | 72 | 21.0 | 23.7 | 26.9 | 25.9 | 31.9 | 31.4 | 31.5 | 29.2 |
| 3 | 2 | 86 | 73 | 65 | 17.5 | 22.8 | 26.2 | 25.2 | 39.0 | 35.9 | 35.7 | 31.1 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 70 | 72 | 63 | 30.6 | 31.8 | 32.0 | 28.8 | 38.4 | 36.9 | 36.7 | 32.3 |
| 1 | 2 | 86 | 81 | 69 | | | | | | | | |
| 2 | 1 | 77 | 70 | 63 | 28.1 | 28.2 | 29.2 | 29.2 | 32.7 | 34.2 | 32.2 | 20.9 |
| 2 | 2 | 75 | 75 | 75 | 31.6 | 30.2 | 31.3 | 29.7 | 37.0 | 33.1 | 33.1 | 30.3 |
| 3 | 1 | 60 | 60 | 58 | 26.1 | 27.3 | 29.6 | 28.9 | 33.0 | 37.4 | 33.6 | 30.1 |
| 3 | 2 | 77 | 69 | 68 | 26.1 | 26.6 | 30.0 | 30.0 | 34.4 | 34.3 | 32.6 | 31.4 |

| Bulk density, g/cm³ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.10 | 1.05 | 1.04 | 1.18 | 1.20 | 1.20 |
| 12-15" depth | 1.20 | 1.25 | 1.23 | 1.24 | 1.28 | 1.23 |

Soil type: **Grundy silt loam (Iowa)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 69.0 | 73.0 | 71.5 | 34.8 | 40.2 | 33.5 | 36.6 | 42.7 | 45.5 | 44.6 |
| 1 | 2 | 83.0 | | 71.0 | 23.1 | 28.6 | 34.8 | 36.4 | 34.0 | 44.1 | 51.6 |
| 2 | 1 | 95.0 | 83.0 | 91.0 | 18.4 | 25.7 | 35.2 | 36.6 | 38.5 | 45.1 | 44.2 |
| 2 | 2 | 75.0 | 74.5 | 78.0 | 33.9 | 34.0 | 36.7 | 40.6 | 37.5 | 46.8 | 46.8 |
| 3 | 1 | 74.0 | 75.0 | 72.5 | 31.9 | 32.6 | 40.0 | 39.3 | 35.3 | 43.5 | 47.7 |
| 3 | 2 | 79.0 | 68.5 | 64.0 | 33.2 | 30.6 | 40.0 | 40.3 | 37.0 | 41.5 | 45.2 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 72.0 | 73.0 | 68.0 | 37.5 | 34.8 | 43.7 | 44.8 | 45.9 | 51.0 | 51.7 |
| 1 | 2 | 82.0 | 80.5 | 72.5 | 41.4 | 43.9 | 40.0 | 41.7 | 43.3 | 47.1 | 46.1 |
| 2 | 1 | 82.0 | | 81.0 | 41.5 | 43.0 | 40.8 | 41.7 | 42.8 | 45.9 | 48.0 |
| 2 | 2 | 70.5 | 71.0 | 74.0 | 41.5 | 41.4 | 42.2 | 42.8 | 40.3 | 43.9 | 45.1 |
| 3 | 1 | 69.0 | 71.0 | 78.0 | 33.2 | 40.4 | 42.4 | 43.2 | 43.1 | 47.8 | 46.9 |
| 3 | 2 | 76.0 | 75.0 | 81.0 | 45.5 | 41.5 | 42.5 | 42.5 | 43.3 | 45.5 | 45.5 |

Soil type: **Holdrege silt loam (Nebraska)**

| Rep. | Initial run Soil temp., °F. Before | Initial run Soil temp., °F. After | Initial run Water temp., °F. | Wet run Soil temp., °F. Before | Wet run Soil temp., °F. After | Wet run Water temp., °F. | Initial run antecedent moisture content, percent by weight 0-5" depth | 5-16" depth | 16-28" depth | 28-35" depth |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 69 | 58 | | 63 | 62 | 26.3 | 13.9 | 14.6 | 15.4 |
| 2 | 117 | 90 | 84 | 125 | 92 | 80 | 10.6 | 12.8 | 12.3 | 9.8 |
| 3 | 98 | 88 | 85 | 102 | 81 | 72 | 4.9 | 7.2 | 8.1 | 6.8 |

*Appendix Table 4 (continued).*

Soil type: **Hoytville clay (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 75.0 | 76.0 | 74.5 | 16.1 | 18.8 | 28.0 | 24.7 | 30.9 | 32.3 | 31.0 |
| 1 | 2 | 69.0 | 71.0 | 68.5 | 17.8 | 20.5 | 27.6 | 28.0 | 30.1 | 30.5 | 32.6 |
| 2 | 1 | 97.0 | 23.0 | 91.5 | 9.0 | 20.9 | 26.5 | 27.8 | 30.4 | 29.7 | 31.9 |
| 2 | 2 | 83.0 | 82.0 | 87.5 | 6.7 | 16.2 | 27.3 | 26.0 | 27.5 | 25.3 | 30.9 |
| 3 | 1 | 81.0 | 75.0 | 71.0 | 7.3 | 17.0 | 25.6 | 26.0 | 27.8 | 28.7 | 30.8 |
| 3 | 2 | 94.0 | 77.0 | 74.5 | 4.9 | 11.8 | 26.6 | 27.3 | 25.6 | 30.8 | 29.2 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 76.5 | 76.5 | 75.0 | 44.8 | 43.9 | 34.9 | 34.8 | 35.2 | 36.3 | 36.2 |
| 1 | 2 | 70.0 | 72.5 | 70.0 | 48.2 | 46.6 | 42.9 | 36.0 | 33.3 | 33.2 | 33.2 |
| 2 | 1 | 87.0 | 84.0 | 90.5 | 36.9 | 38.0 | 33.4 | 36.1 | 35.3 | 34.7 | 34.1 |
| 2 | 2 | 76.0 | 79.0 | 85.0 | 43.2 | 37.4 | 38.0 | 38.0 | 34.4 | 31.7 | 32.6 |
| 3 | 1 | 74.0 | 74.0 | 73.0 | 42.5 | 41.9 | 38.0 | 36.0 | 35.0 | 32.9 | 35.3 |
| 3 | 2 | 79.0 | 76.0 | 67.5 | 44.0 | 45.4 | 36.8 | 36.6 | 36.1 | 33.8 | 37.9 |

Soil type: **Ida silt loam (Iowa)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 85.0 | 70.0 | 70.5 | 24.6 | 25.9 | 30.9 | 21.7 | 19.2 | 22.4 | 19.4 |
| 1 | 2 | 78.5 | 73.5 | 71.5 | 23.7 | 26.7 | 28.8 | 26.0 | 23.9 | 22.4 | 22.2 |
| 2 | 1 | 85.5 | 74.5 | 73.0 | 22.4 | 25.4 | 26.0 | 25.7 | 23.0 | 24.9 | 22.2 |
| 2 | 2 | 91.0 | | 70.0 | 20.0 | 24.3 | 24.2 | 22.8 | 21.6 | 21.1 | 23.3 |
| 3 | 1 | 79.5 | 77.5 | 72.5 | 15.2 | 16.3 | 17.3 | 22.9 | 21.2 | 21.9 | 21.2 |
| 3 | 2 | 95.0 | 81.0 | 70.5 | 15.9 | 21.4 | 24.8 | 22.7 | 20.3 | 20.2 | 21.2 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 79.0 | 77.0 | 71.0 | 37.3 | 33.9 | 34.0 | 32.1 | 28.8 | 28.9 | 26.6 |
| 1 | 2 | 77.5 | 75.0 | 67.5 | 33.8 | 32.8 | 33.4 | 29.7 | 27.4 | 26.5 | 25.1 |
| 2 | 1 | 79.0 | 74.0 | 71.0 | 28.9 | 27.8 | 27.0 | 25.4 | 24.5 | 23.2 | 24.8 |
| 2 | 2 | 87.0 | 82.0 | 80.0 | 27.1 | 27.7 | 26.0 | 25.6 | 25.2 | 25.9 | 26.1 |
| 3 | 1 | 80.0 | 73.0 | 70.5 | 31.8 | 29.6 | 30.4 | 30.6 | 28.0 | 27.4 | 26.5 |
| 3 | 2 | 90.5 | 81.0 | 73.0 | 37.7 | 31.5 | 27.8 | 30.2 | 26.9 | 25.5 | 24.3 |

Soil type: **Keith very fine sandy loam (Nebraska)**

| Rep. | Initial run Soil temp., °F. Before | Initial run Soil temp., °F. After | Initial run Water temp., °F. | Wet run Soil temp., °F. Before | Wet run Soil temp., °F. After | Wet run Water temp., °F. | Initial run antecedent moisture content, percent by weight 1-10" depth | 10-26" depth | 26-48" depth |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | 72 | 67 | | 62 | 64 | 10.8 | 13.6 | 13.8 |
| 2 | | 84 | 69 | | 69 | 59 | 10.8 | 13.4 | 19.5 |
| 3 | | 105 | 61 | | 70 | 59 | 12.7 | 18.9 | 28.1 |

*Appendix Table 4 (continued).*

Soil type: **Moody silt loam (Iowa)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 69.0 | 63.5 | 63.0 | 25.5 | 31.3 | 32.6 | 30.7 | 28.9 | 35.6 | 31.7 |
| 1 | 2 | 72.0 | 67.5 | 61.0 | 29.5 | 37.4 | 34.1 | 32.9 | 28.6 | 31.6 | 30.8 |
| 2 | 1 | 84.0 | 69.5 | 59.5 | 26.6 | 23.7 | 31.7 | 29.0 | 28.2 | 27.4 | 28.3 |
| 2 | 2 | 82.5 | 74.5 | 62.0 | 32.8 | 35.2 | 35.2 | 31.4 | 31.0 | 34.4 | 29.8 |
| 3 | 1 | 72.5 | 67.0 | 59.0 | 24.7 | 27.5 | 28.2 | 25.8 | 27.1 | 27.0 | 25.7 |
| 3 | 2 | 74.0 | 68.5 | 58.5 | 28.7 | 30.9 | 30.5 | 29.0 | 25.6 | 29.0 | 27.8 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 80.5 | 76.0 | 69.5 | 35.0 | 33.7 | 35.5 | 40.4 | 33.2 | 27.8 | 32.9 |
| 1 | 2 | 81.5 | 74.5 | 62.0 | 37.4 | 38.7 | 37.3 | 32.4 | 32.7 | 44.5 | 29.9 |
| 2 | 1 | 71.5 | 72.0 | 62.0 | 39.2 | 38.6 | 36.1 | 33.5 | 32.3 | 33.0 | 32.9 |
| 2 | 2 | 72.5 | 72.0 | 76.5 | 37.0 | 39.3 | 39.4 | 37.1 | 34.1 | 35.4 | 35.9 |
| 3 | 1 | 79.0 | 82.5 | 64.5 | 38.8 | 35.0 | 37.7 | 32.8 | 31.2 | 34.8 | 32.4 |
| 3 | 2 | 84.5 | | 65.0 | 36.3 | 37.9 | 38.5 | 30.5 | 31.2 | 32.6 | 33.9 |

Soil type: **Morton loam (North Dakota)**

| Rep. | Dup. | Soil temperature (°F.) at 4-inch depth: Initial run Before | Initial run After | Wet run Before | Wet run After | Aggregate stability of surface 3 inches: Mean weight diameter, mm |
|---|---|---|---|---|---|---|
| June | | | | | | |
| 1 | 1 | 65 | 63 | | 66 | .23 |
| 1 | 2 | | 65 | | | .76 |
| 2 | 1 | 60 | 62 | | | .33 |
| 2 | 2 | | | | 68 | .42 |
| 3 | 1 | 77 | 72 | 70 | 67 | .24 |
| 3 | 2 | 60 | 62 | 58 | 59 | .28 |
| | | | | | Average: | .38±.08 |
| August | | | | | | |
| 1 | 1 | 87 | 75 | | | .39 |
| 1 | 2 | | | | | .62 |
| 2 | 1 | 65 | 68 | | 69 | .51 |
| 2 | 2 | 80 | 70 | | | .45 |
| 3 | 1 | 84 | 65 | | | .38 |
| 3 | 2 | 83 | 74 | | 72 | .32 |
| | | | | | Average: | .45±.04 |

| | Initial run antecedent moisture content, percent by volume: 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|
| June | 30.7 | 30.2 | 28.9 | 28.8 | 33.0 | 27.5 |
| August | 17.8 | 20.0 | 23.6 | 24.5 | 23.6 | 26.9 |

Soil type: **Sharpsburg silty clay loam (Nebraska)**

| Rep. | Initial run Soil temp., °F. Before | Initial run Soil temp., °F. After | Initial run Water temp., °F. | Wet run Soil temp., °F. Before | Wet run Soil temp., °F. After | Wet run Water temp., °F. | Initial run antecedent moisture content, percent by weight: 0-12" depth | 12-15" depth | 15-26" depth | 26-35" depth | 35-46" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 77 | 74 | 79 | 76 | 63 | 76 | 20.9 | 22.5 | 26.7 | 23.7 | 18.2 |
| 2 | 119 | 96 | 65 | 79 | 69 | 73 | 20.5 | 19.8 | 22.3 | 22.3 | 18.3 |
| 3 | 108 | 87 | 75 | 81 | 72 | 78 | 23.0 | 23.0 | 25.1 | 22.7 | 23.4 |
| 4 | 94 | 81 | 65 | 101 | 75 | 64 | 21.4 | 20.5 | 22.0 | 21.3 | 19.5 |

*Appendix Table 4 (continued).*

Soil type: **Webster clay loam (Minnesota)**

| Rep. Dup. | Moisture content, percent by volume | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4" depth | 8" depth | 12" depth | 16" depth | 20" depth | 24" depth | 28" depth | 32" depth | 36" depth | 40" depth |
| Initial run | | | | | | | | | | |
| 1 | 13.9 | 14.2 | 14.1 | 12.6 | 12.5 | 13.4 | 14.9 | 15.3 | 14.9 | 15.2 |
| 2 | 12.0 | 12.9 | 10.4 | 9.8 | 9.6 | 10.6 | 12.3 | 12.8 | 13.6 | 14.3 |
| 3 | 14.5 | 13.2 | 11.7 | 11.2 | 10.3 | 10.2 | 9.8 | 10.9 | 14.2 | 14.7 |
| Wet run | | | | | | | | | | |
| 1 | 20.8 | 21.3 | 20.6 | 20.1 | 19.8 | 17.8 | 16.4 | 15.5 | 16.0 | 15.8 |
| 2 | 26.9 | 24.0 | 19.8 | 16.3 | 10.5 | 10.1 | 12.1 | 13.2 | 13.4 | 13.3 |
| 3 | 23.3 | 26.0 | 22.2 | 21.3 | 20.4 | 18.7 | 15.9 | 15.8 | 13.4 | 13.6 |

*Appendix Table 5. Accessory Data From Initial and Wet Infiltration Runs on Soils With Clipped Bromegrass Treatment*

Soil type: **Bearden silty clay loam (North Dakota)**

| Rep. | Moisture content, percent by volume | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth |
| Initial run antecedent moisture | | | | | | | |
| 1 | 27.1 | 31.0 | 30.4 | 27.6 | 35.4 | 38.6 | 42.8 |
| 2 | 26.7 | 32.0 | 32.6 | 27.5 | 31.8 | 35.1 | 38.4 |
| 3 | 32.7 | 31.1 | 30.1 | 26.6 | 30.6 | 35.2 | 36.5 |
| Moisture two days after wet run | | | | | | | |
| 1 | 40.3 | 42.8 | 42.4 | 39.4 | 42.3 | 41.0 | 45.1 |
| 2 | 41.0 | 43.8 | 42.4 | 37.2 | 40.6 | 42.6 | 42.6 |
| 3 | 41.3 | 39.4 | 41.3 | 39.1 | 41.8 | 45.8 | 44.7 |

| Aggregate stability of surface 3 inches | Replicates, duplicates | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 | Average |
| Mean wt. diameter, mm | 1.47 | 1.40 | 1.41 | 1.05 | 1.26 | 1.24 | 1.31±.07 |

Soil type: **Blount silty clay loam (Ohio)**

| Rep. | Dup. | Soil temp., °F. | | Water temp., °F. | Antecedent moisture content, percent by volume | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Before | After | | 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
| Initial run | | | | | | | | | | | |
| 1 | 1 | 61.0 | 60.5 | 62.0 | 24.5 | 26.3 | 31.0 | 34.0 | 32.6 | 32.3 | 33.6 |
| 1 | 2 | 64.5 | 66.0 | 66.5 | 19.3 | 20.3 | 28.2 | 34.4 | 30.7 | 30.5 | 30.2 |
| 2 | 1 | 70.0 | 65.5 | 66.0 | 21.3 | 22.8 | 27.6 | 31.6 | 27.8 | 29.9 | 28.1 |
| 2 | 2 | 68.0 | 70.0 | 69.0 | 26.4 | 25.8 | 28.2 | 36.3 | 34.1 | 36.9 | 34.7 |
| 3 | 1 | 73.5 | 74.5 | 71.5 | 15.8 | 14.6 | 25.7 | 26.2 | 23.4 | 21.5 | 33.6 |
| 3 | 2 | 74.5 | 69.5 | 71.0 | 24.2 | 19.5 | 25.4 | 27.3 | 27.0 | 31.8 | 29.6 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 62.5 | 64.0 | 66.0 | 32.8 | 31.0 | 32.6 | 35.2 | 42.9 | 34.5 | 36.6 |
| 1 | 2 | 69.5 | 66.5 | 68.5 | 32.6 | 27.6 | 33.3 | 38.0 | 33.3 | 31.3 | 35.5 |
| 2 | 1 | 61.0 | 62.5 | 65.0 | 31.4 | 28.1 | 34.2 | 36.5 | 37.1 | 36.2 | 29.7 |
| 2 | 2 | 71.0 | 72.0 | 70.5 | 38.4 | 35.0 | 38.2 | 47.4 | 45.1 | 41.8 | 37.3 |
| 3 | 1 | 71.0 | 70.0 | 69.5 | 35.7 | 34.2 | 34.4 | 33.0 | 31.7 | 26.5 | 27.6 |
| 3 | 2 | 76.0 | 70.5 | 72.0 | 37.0 | 34.0 | 35.8 | 35.5 | 35.9 | 34.3 | 30.4 |

*Appendix Table 5 (continued).*

Soil type: **Canfield silt loam (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 76.0 | 78.0 | 75.0 | 37.4 | 33.8 | 30.5 | | | | |
| 1 | 2 | 79.5 | 77.0 | 74.5 | 38.5 | 32.3 | 36.1 | 38.2 | 39.8 | 29.3 | 30.7 |
| 2 | 1 | 58.0 | 61.5 | 59.5 | 39.0 | 36.4 | 36.9 | 42.2 | 41.1 | 32.8 | 27.4 |
| 2 | 2 | 69.5 | 67.0 | 67.0 | 38.8 | 38.7 | 35.0 | 37.7 | 37.8 | 35.4 | 31.6 |
| 3 | 1 | 79.5 | 72.5 | 67.5 | 32.8 | 28.7 | 29.4 | 25.6 | 36.7 | 32.8 | 27.3 |
| 3 | 2 | 82.5 | 76.0 | 74.0 | 31.4 | 29.7 | 31.0 | 33.5 | 35.5 | 29.3 | 27.4 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 84.0 | 80.0 | 77.0 | 38.1 | 34.1 | 31.8 | 32.7 | 36.7 | 31.0 | 27.6 |
| 1 | 2 | 75.0 | 79.0 | 66.0 | 38.6 | 35.4 | 35.2 | 36.3 | 38.9 | 30.9 | 26.6 |
| 2 | 1 | 65.0 | 66.0 | 65.5 | 40.3 | 38.1 | 36.7 | 40.4 | 36.3 | 25.5 | 22.2 |
| 2 | 2 | 75.0 | 73.0 | 71.0 | 41.6 | 34.4 | 32.9 | 35.2 | 33.8 | 27.7 | 27.3 |
| 3 | 1 | 70.0 | 68.0 | 65.0 | 35.4 | 32.3 | 35.3 | 37.1 | | | |
| 3 | 2 | 68.5 | 69.0 | 67.5 | 35.9 | 30.7 | 33.8 | 42.1 | 37.7 | 30.2 | 28.5 |

Soil type: **Cisne silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 83 | 86 | 76 | 12.4 | 7.4 | 8.5 | 10.6 | 40.6 | 28.2 | 31.3 | 26.7 |
| 1 | 2 | 96 | 82 | 85 | 7.7 | 7.6 | 11.4 | 15.2 | 32.2 | 30.3 | 28.3 | 23.4 |
| 2 | 1 | 72 | 77 | 74 | 13.8 | 11.9 | 11.2 | 14.4 | 34.4 | 29.1 | 28.9 | 21.4 |
| 2 | 2 | 64 | 65 | 66 | 11.8 | 12.2 | 7.3 | 10.7 | 35.1 | 25.4 | 8.5 | 11.2 |
| 3 | 1 | 72 | 73 | 70 | 10.5 | 10.6 | 7.4 | 8.4 | 31.4 | 26.2 | 16.3 | 15.1 |
| 3 | 2 | 81 | 73 | 71 | 11.8 | 10.8 | 7.8 | 9.1 | 31.3 | 23.9 | 14.9 | 9.5 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 91 | 80 | 87 | 30.0 | 23.9 | 24.6 | 25.3 | 39.1 | 29.7 | 30.1 | 29.9 |
| 1 | 2 | 85 | 79 | | 28.7 | 24.7 | 25.9 | 24.9 | 40.1 | 28.5 | 29.5 | 29.5 |
| 2 | 1 | | | | | | | | | | | |
| 2 | 2 | 71 | 71 | 68 | 23.8 | 20.6 | 20.7 | 12.5 | 47.6 | 28.1 | 27.2 | 13.2 |
| 3 | 1 | 83 | 75 | 70 | 25.6 | 21.4 | 19.9 | 7.8 | 30.1 | 23.7 | 21.9 | 14.9 |
| 3 | 2 | 86 | 76 | 73 | 22.4 | 22.3 | 21.7 | 9.6 | 35.8 | 27.8 | 23.4 | 6.4 |

| Bulk density, g/cm³ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 3,1 | 3,2 | 4,1 |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.41 | 1.40 | 1.42 | 1.31 | 1.37 | 1.38 |
| 12-15" depth | 1.37 | 1.37 | 1.34 | 1.39 | 1.35 | 1.38 |

Soil type: **Dudley clay loam (South Dakota)** Crop stage: 4 inches (dormant)

| Rep. | Dup. | Antecedent moisture content, percent by volume 0-8" depth | 8-12" depth | 12-18" depth | 18-25" depth | 25-35" depth | 35-45" depth | 45-60" depth |
|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | |
| Representative sample | | 19.8 | 23.5 | 17.5 | 26.7 | 15.1 | 17.3 | 26.6 |
| Wet run | | | | | | | | |
| 1 | 1 | 41.5 | 40.4 | 38.2 | 34.9 | 34.4 | 31.5 | 38.6 |
| 1 | 2 | 38.0 | 37.0 | 35.4 | 36.8 | 32.3 | 34.8 | 38.3 |
| 2 | 1 | 38.4 | 39.3 | 37.9 | 18.4 | 19.3 | 24.5 | 26.9 |
| 2 | 2 | 37.7 | 37.0 | 31.9 | 30.5 | 12.0 | 17.9 | 23.5 |
| 3 | 1 | 40.8 | 34.3 | 32.5 | 31.4 | 15.4 | 15.8 | 20.5 |
| 3 | 2 | 41.0 | 36.0 | 37.8 | 31.1 | 25.3 | 20.6 | 27.5 |

*Appendix Table 5 (continued).*

Soil type: **Elliott silt loam (Illinois)** Crop stage: Alfalfa, clipped

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 75 | | 69 | 29.7 | 25.0 | 22.9 | 20.2 | 33.1 | 28.8 | 28.3 | 30.0 |
| 1 | 2 | 68 | 66 | 65 | 24.2 | 23.4 | 22.9 | 22.6 | 40.5 | 32.2 | 32.4 | 29.8 |
| 2 | 1 | 68 | 67 | 64 | 24.5 | 22.0 | 19.7 | 19.4 | 30.4 | 32.0 | 24.7 | 24.4 |
| 2 | 2 | 79 | 76 | 81 | 27.3 | 22.9 | 21.3 | 22.9 | 34.5 | 29.9 | 27.1 | 34.9 |
| 3 | 1 | 79 | 77 | 72 | 31.9 | 31.7 | 25.2 | 22.5 | 39.4 | 29.8 | 29.2 | 29.8 |
| 3 | 2 | 72 | | 66 | 26.3 | 26.1 | 22.8 | 23.2 | 26.3 | 29.1 | 31.5 | 30.5 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 69 | 72 | 65 | 32.2 | 27.6 | 26.6 | 26.5 | 38.8 | 31.6 | 29.5 | 28.3 |
| 1 | 2 | 77 | 72 | 72 | 28.9 | 24.2 | 25.1 | 23.7 | 33.2 | 26.4 | 29.1 | 26.5 |
| 2 | 1 | 68 | 72 | 57 | 31.1 | 27.1 | 25.5 | 22.8 | 30.0 | 26.8 | 33.4 | 29.9 |
| 2 | 2 | 81 | 81 | 73 | 28.2 | 23.2 | 24.0 | 24.1 | 33.4 | 26.4 | 28.5 | 27.8 |
| 3 | 1 | 84 | | 76 | 34.8 | 26.2 | 26.4 | 23.3 | 35.8 | 30.8 | 30.1 | 26.1 |
| 3 | 2 | 74 | 75 | 74 | 28.6 | 24.8 | 27.8 | 22.8 | 33.4 | 29.4 | 33.6 | 29.7 |

| Bulk density, g/cm³ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.33 | 1.29 | 1.36 | 1.16 | 1.31 | 1.25 |
| 12-15" depth | 1.34 | 1.30 | 1.30 | 1.30 | 1.29 | 1.30 |

Soil type: **Flanagan silt loam (Illinois)** Crop stage: Kentucky bluegrass, clipped

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 76 | 70 | 73 | 8.3 | 10.1 | 12.5 | 15.3 | 33.1 | 31.4 | 30.6 | 30.0 |
| 1 | 2 | 80 | 84 | 72 | 8.2 | 8.5 | 11.2 | 15.8 | | 31.7 | 31.6 | 29.9 |
| 2 | 1 | 83 | 72 | 69 | 8.8 | 10.8 | 12.6 | 14.2 | 31.5 | 28.4 | 29.4 | 17.0 |
| 2 | 2 | 61 | 63 | 68 | 8.0 | 9.3 | 11.8 | 13.4 | 33.6 | 32.2 | 29.7 | 22.7 |
| 3 | 1 | 67 | 64 | 67 | 9.6 | 10.2 | 13.5 | 14.4 | 34.9 | 27.4 | 25.9 | 23.5 |
| 3 | 2 | 71 | 63 | 64 | 9.3 | 9.8 | 12.1 | 14.6 | 31.4 | 30.8 | 28.1 | 16.5 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 73 | 78 | 74 | 27.4 | 28.6 | 31.4 | 22.7 | 37.6 | 32.2 | 32.6 | 28.9 |
| 1 | 2 | 78 | 75 | 73 | 31.2 | 29.8 | 28.7 | 27.2 | 36.6 | 31.6 | 30.1 | 23.3 |
| 2 | 1 | 67 | 64 | 63 | 30.5 | 29.1 | 28.9 | 27.2 | 40.1 | 33.4 | 30.4 | 27.8 |
| 2 | 2 | 59 | 62 | 63 | 31.4 | 27.7 | 28.2 | 27.5 | 36.4 | 33.3 | 30.8 | 29.2 |
| 3 | 1 | 68 | 65 | 65 | 30.4 | 26.9 | 28.1 | 26.7 | 32.7 | 32.0 | 31.9 | 29.7 |
| 3 | 2 | 58 | 62 | 65 | 32.2 | | 29.6 | 27.4 | 36.5 | 32.4 | 33.7 | 31.6 |

| Bulk density, g/cm³ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.11 | 1.11 | 1.23 | 1.01 | 1.17 | 1.16 |
| 12-15" depth | 1.16 | 1.10 | 1.19 | 1.18 | 1.10 | 1.21 |

*Appendix Table 5 (continued).*

Soil type: **Grundy silt loam (Iowa)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 79.5 | 78.0 | 83.0 | 35.1 | 33.2 | 36.0 | 35.0 | 39.6 | 44.4 | 45.5 |
| 1 | 2 | 73.5 | 75.0 | 79.5 | 35.1 | 38.6 | 37.8 | 33.5 | 37.7 | 40.9 | 44.5 |
| 2 | 1 | 75.0 | 71.0 | 64.5 | 33.0 | 34.4 | 30.4 | 28.7 | 30.7 | 41.8 | 44.6 |
| 2 | 2 | 84.0 | | 77.0 | 27.5 | 29.1 | 27.8 | 29.2 | 29.5 | 39.9 | 41.2 |
| 3 | 1 | 75.0 | 73.5 | 74.0 | 38.6 | 33.6 | 28.4 | 27.9 | 33.6 | 41.3 | 42.0 |
| 3 | 2 | 83.0 | 80.0 | 85.0 | 30.0 | 32.4 | 35.4 | 32.2 | 33.2 | 38.4 | 41.8 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 81.0 | 79.0 | 86.0 | 35.9 | 37.0 | 40.8 | 41.7 | 45.8 | 43.8 | 41.8 |
| 1 | 2 | 82.5 | 80.0 | 83.0 | 40.0 | 41.9 | 41.0 | 40.8 | 39.6 | 43.3 | 42.5 |
| 2 | 1 | | | | 37.4 | 35.9 | 39.2 | 38.9 | 39.5 | 45.1 | 43.5 |
| 2 | 2 | 91.0 | 83.0 | 75.0 | 42.6 | 37.5 | 41.8 | 39.5 | 39.9 | 42.6 | 42.5 |
| 3 | 1 | 82.5 | | 82.0 | 40.6 | 38.4 | 39.6 | 39.5 | 44.8 | 47.2 | 45.6 |
| 3 | 2 | 74.0 | 78.0 | 79.5 | 36.2 | 34.6 | 39.4 | 39.2 | 41.4 | 42.6 | 42.5 |

Soil type: **Holdrege silt loam (Nebraska)**

| Rep. | Initial run Soil temp., °F. Before | Initial run Soil temp., °F. After | Initial run Water temp., °F. | Wet run Soil temp., °F. Before | Wet run Soil temp., °F. After | Wet run Water temp., °F. | Initial run antecedent moisture content, percent by volume 0-5" depth | 5-16" depth | 16-28" depth | 28-35" depth |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | 70 | 63 | | 75 | 63 | 7.2 | 9.1 | 5.0 | 9.3 |
| 2 | 121 | 110 | 82 | 137 | 92 | 76 | 9.0 | 12.1 | 13.4 | 11.2 |
| 3 | | 71 | 60 | | 70 | 64 | 5.4 | 7.4 | 18.2 | 7.8 |

Soil type: **Hoytville clay (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 64.0 | 65.0 | 63.5 | 18.1 | 19.2 | 23.4 | 24.7 | 23.1 | 21.2 | 21.1 |
| 1 | 2 | 68.5 | 66.5 | 65.5 | 19.5 | 21.9 | 22.6 | 22.6 | 24.6 | 24.1 | 26.2 |
| 2 | 1 | 88.5 | 77.5 | 76.0 | 16.8 | 20.8 | 23.8 | 22.6 | 24.3 | 24.4 | 23.0 |
| 2 | 2 | 80.0 | 75.0 | 74.0 | 15.8 | 22.4 | 23.5 | 24.0 | 24.3 | 24.2 | 25.6 |
| 3 | 1 | 86.0 | 70.0 | 77.5 | 14.5 | 18.8 | 25.7 | 26.1 | 27.0 | 21.2 | 24.8 |
| 3 | 2 | 71.0 | 67.0 | 63.5 | 20.0 | 23.1 | 25.0 | 24.8 | 25.2 | 24.4 | 24.3 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 67.5 | 70.0 | 67.0 | 37.6 | 37.2 | 34.6 | 33.5 | 35.7 | 33.1 | 32.0 |
| 1 | 2 | 76.5 | 75.0 | 73.5 | 42.4 | 36.5 | 38.3 | 36.4 | 38.0 | 34.2 | 35.1 |
| 2 | 1 | 86.5 | 79.5 | 79.0 | 37.6 | 36.0 | 36.4 | 35.6 | 37.5 | 34.4 | 35.6 |
| 2 | 2 | 73.0 | 76.0 | 80.0 | 36.9 | 37.2 | 37.8 | 38.0 | 36.8 | 33.0 | 31.4 |
| 3 | 1 | 81.0 | 69.0 | 64.5 | 32.5 | 31.9 | 32.7 | 33.3 | 29.0 | 30.1 | 33.1 |
| 3 | 2 | 67.0 | 67.0 | 69.0 | 34.9 | 33.9 | 34.7 | 34.5 | 32.0 | 30.2 | 30.9 |

*Appendix Table 5 (continued).*

Soil type: **Ida silt loam (Iowa)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6 depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 75.0 | 66.0 | 65.0 | 31.1 | 30.4 | 29.9 | 27.8 | 26.2 | 28.0 | 15.8 |
| 1 | 2 | 66.0 | 66.0 | 63.0 | 32.1 | 28.7 | 28.6 | 27.6 | 26.9 | 25.2 | 27.2 |
| 2 | 1 | 76.5 | 66.0 | 63.5 | 28.1 | 27.9 | 29.9 | 27.2 | 26.6 | 25.0 | 25.7 |
| 2 | 2 | 73.5 | 75.5 | 70.0 | 17.7 | 19.0 | 21.2 | 19.2 | 19.4 | 18.0 | 16.9 |
| 3 | 1 | 83.5 | 74.5 | 71.0 | 10.7 | 17.9 | 20.4 | 21.0 | 21.2 | 21.3 | 22.8 |
| 3 | 2 | 88.0 | 78.5 | 75.0 | 12.6 | 17.3 | 18.5 | 19.9 | 19.0 | 20.9 | 21.6 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 68.0 | 69.0 | 66.0 | 23.4[a] | 21.4[a] | 26.6[a] | 28.1[a] | 22.4[a] | 23.2[a] | 23.8[a] |
| 1 | 2 | 72.0 | 71.5 | 69.5 | 33.2 | 33.7 | 30.9 | 28.7 | 27.0 | 27.8 | 28.0 |
| 2 | 1 | 75.5 | 70.5 | | 34.0 | 30.7 | 34.0 | 31.0 | 27.7 | 29.0 | 28.2 |
| 2 | 2 | 84.0 | 82.0 | 75.0 | 28.2 | 27.1 | 26.7 | 24.1 | 23.7 | 23.1 | 22.1 |
| 3 | 1 | 88.5 | 83.0 | 74.5 | 23.7 | 25.7 | 26.2 | 23.3 | 23.4 | 23.2 | 22.7 |
| 3 | 2 | 79.0 | 77.0 | 70.5 | 29.3 | 28.1 | 28.2 | 28.7 | 23.7 | 23.6 | 25.2 |

[a]These values appear to be in error.

Soil type: **Keith very fine sandy loam (Nebraska)** Crop stage: Intermediate wheatgrass, clipped

| Rep. | Initial run Soil temp., °F. Before | Initial run Soil temp., °F. After | Initial run Water temp., °F. | Wet run Soil temp., °F. Before | Wet run Soil temp., °F. After | Wet run Water temp., °F. | Initial run antecedent moisture content, percent by weight 1-10" depth | 10-26" depth | 26-48" depth |
|---|---|---|---|---|---|---|---|---|---|
| 1 | | 90 | 68 | | 75 | 77 | 5.4 | 6.3 | 7.7 |
| 2 | | 83 | 69 | | 73 | 68 | 3.4 | 4.9 | 6.8 |
| 3 | | 104 | 63 | | 74 | 76 | 2.5 | 5.0 | 7.4 |

Soil type: **Kenyon silt loam (Minnesota)**

| Rep. | Dup. | Antecedent moisture content, percent by volume 0-7" depth | 7-13" depth | 13-24" depth | 24-30" depth | 30-40" depth | 40-48"+ depth |
|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | |
| 1 | 1 | 10.0 | 9.7 | 9.0 | 7.1 | 7.2 | 7.3 |
| 2 | 1 | 19.2 | 19.5 | 16.2 | 12.2 | 14.0 | 13.1 |
| 2 | 2 | 23.5 | 22.2 | 17.5 | 12.2 | 12.5 | 14.5 |
| Wet run | | | | | | | |
| 1 | 1 | 23.1 | 22.5 | 21.6 | 13.5 | 7.1 | 7.0 |
| 2 | 1 | 29.0 | 27.0 | 24.2 | 14.5 | 12.7 | 13.0 |
| 2 | 2 | 31.5 | 30.2 | 31.1 | 24.5 | 18.2 | 24.1 |

Soil type: **Kranzburg silty clay loam (South Dakota)**

| Rep. | Dup. | Antecedent moisture content, percent by volume 0-8" depth | 8-14" depth | 14-20" depth | 20-28" depth | 28-35" depth | 35-45" depth | 45-60" depth |
|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | |
| Representative sample | | 20.4 | 21.2 | 23.1 | 23.5 | 26.1 | 19.8 | 18.3 |
| Wet run | | | | | | | | |
| 1 | 1 | 34.0 | 22.5 | 23.4 | 22.1 | 19.3 | 24.6 | 24.1 |
| 1 | 2 | 30.3 | 28.7 | 25.5 | 22.8 | 21.0 | 28.6 | 29.0 |
| 2 | 1 | 29.4 | 25.6 | 26.6 | 23.3 | 19.2 | 24.4 | 26.7 |
| 2 | 2 | 37.8 | 32.6 | 32.4 | 29.9 | 20.5 | 25.7 | 26.5 |
| 3 | 1 | 35.5 | 28.8 | 23.6 | 23.6 | 15.4 | 30.9 | 26.3 |
| 3 | 2 | 38.7 | 33.3 | 33.2 | 30.1 | 26.7 | 26.7 | 29.8 |

*Appendix Table 5 (continued).*

Soil type: **Moody silt loam (Iowa)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 57.0 | 59.5 | 54.5 | 16.5 | 17.1 | 16.7 | 16.2 | 17.1 | 16.8 | 16.8 |
| 1 | 2 | 66.0 | 62.5 | 55.0 | 22.9 | 23.6 | 20.6 | 17.0 | 16.2 | 19.9 | 23.3 |
| 2 | 1 | 73.5 | 67.0 | 57.5 | 23.5 | 23.7 | 18.4 | 15.0 | 15.4 | 16.0 | 14.4 |
| 2 | 2 | 74.5 | 67.5 | 61.0 | 19.7 | 22.8 | 23.0 | 16.3 | 16.0 | 16.5 | 15.7 |
| 3 | 1 | 78.0 | 74.5 | 62.5 | 24.8 | 23.5 | 21.6 | 17.6 | 14.9 | 13.8 | 13.0 |
| 3 | 2 | 75.5 | 73.5 | 60.0 | 26.2 | 24.1 | 18.6 | 15.7 | 13.6 | 12.6 | 11.7 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 76.5 | 69.5 | 60.5 | 32.3 | 28.3 | 34.3 | 30.0 | 23.8 | 19.9 | 19.9 |
| 1 | 2 | 73.0 | 69.5 | 60.0 | 34.6 | 32.2 | 35.8 | 30.5 | 28.3 | 27.0 | 19.1 |
| 2 | 1 | 70.5 | 69.0 | 62.0 | 32.3 | 29.0 | 33.4 | 31.1 | 23.0 | 18.3 | 16.9 |
| 2 | 2 | 76.5 | 71.5 | 62.0 | 32.9 | 30.7 | 31.4 | 28.3 | 20.2 | 17.8 | 17.3 |
| 3 | 1 | 70.5 | 70.0 | 62.0 | 31.3 | 34.4 | 35.6 | 28.7 | 21.4 | | 17.0 |
| 3 | 2 | 82.5 | 78.5 | 64.5 | 30.7 | 34.8 | 33.7 | 31.0 | 24.2 | 21.1 | 18.2 |

Soil type: **Morton loam (North Dakota)** Crop stage: Crested wheatgrass, clipped

| Rep. | Dup. | Soil temperature (°F.) at 4-inch depth: Initial run Before | Initial run After | Wet run Before | Wet run After | Aggregate stability of surface 3 inches: Mean weight diameter, mm |
|---|---|---|---|---|---|---|
| June | | | | | | |
| 1 | 1 | | 72 | | 63 | 1.29 |
| 1 | 2 | 77 | 72 | | | .96 |
| 2 | 1 | | 70 | | 68 | 1.53 |
| 2 | 2 | | | | | 1.26 |
| 3 | 1 | | 70 | 66 | 65 | .37 |
| 3 | 2 | 72 | 64 | 67 | 67 | .63 |
| | | | | | | Average: 1.01±.18 |
| August | | | | | | |
| 1 | 1 | | 73 | | 70 | 1.43 |
| 1 | 2 | | 72 | | 64 | 1.31 |
| 2 | 1 | 97 | 74 | | 70 | 1.46 |
| 2 | 2 | 90 | 67 | 82 | 66 | 1.25 |
| 3 | 1 | 96 | 80 | | 70 | 1.33 |
| 3 | 2 | 81 | 73 | | | 1.21 |
| | | | | | | Average: 1.33±.04 |

| | Initial run antecedent moisture content, percent by volume 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|
| June | 25.5 | 21.3 | 25.6 | 28.3 | 19.4 | 18.3 |
| August | 11.0 | 14.6 | 18.4 | 18.0 | 19.1 | 19.2 |

Soil type: **Port Byron silt loam (Minnesota)**

| Rep. | Antecedent moisture content, percent by volume 0-8" depth | 8-15" depth | 15-20" depth | 20-30" depth | 30-37" depth | 37-48" depth | 48-54" depth |
|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | |
| 1 | 18.5 | 18.4 | 17.7 | 17.7 | 18.3 | 18.8 | 18.6 |
| 2 | 16.5 | 14.1 | 14.3 | 13.9 | 13.2 | 13.1 | 10.6 |
| 3 | 14.0 | 12.2 | 11.7 | 11.3 | 12.1 | 12.0 | 12.5 |
| Wet run | | | | | | | |
| 1 | 33.6 | 34.1 | 33.2 | 30.6 | 30.3 | 28.6 | 22.8 |
| 2 | 29.4 | 31.4 | 32.3 | 21.5 | 14.1 | 12.4 | 8.2 |
| 3 | 29.8 | 30.6 | 31.4 | 29.0 | 15.0 | 14.1 | 16.3 |

*Appendix Table 5 (continued).*

Soil type: **Sharpsburg silty clay loam (Nebraska)**

| Rep. | Initial run Soil temp., °F. Before | Initial run Soil temp., °F. After | Initial run Water temp., °F. | Wet run Soil temp., °F. Before | Wet run Soil temp., °F. After | Wet run Water temp., °F. | Initial run antecedent moisture content, percent by volume 0-12" depth | 12-15" depth | 15-26" depth | 26-35" depth | 35-46" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 101 | 96 | 65 | 109 | 80 | 64 | 19.6 | 15.4 | 15.7 | 15.3 | 14.8 |
| 2 | | 64 | 64 | | 68 | 61 | 19.4 | 14.3 | 15.8 | 14.4 | 15.2 |
| 3 | 90 | 82 | 77 | 80 | 75 | 70 | 9.1 | 13.5 | 11.1 | 14.3 | 16.2 |
| 4 | 111 | 94 | 70 | 73 | 72 | 64 | 9.1 | 10.0 | 10.0 | 14.2 | 13.0 |

Soil type: **Sinai silty clay loam (South Dakota)**

| Rep. | Dup. | Antecedent moisture content, percent by volume 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth | 42-48" depth |
|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | |
| Representative sample | | 42.1 | 37.6 | 40.0 | 39.4 | 31.0 | 38.6 | 38.7 | 39.3 |
| Wet run | | | | | | | | | |
| 1 | 1 | 41.4 | 44.9 | 46.3 | 44.2 | 32.5 | 39.9 | 40.0 | 44.5 |
| 1 | 2 | 27.6 | 35.6 | 36.9 | 43.3 | 31.4 | 34.6 | 38.8 | 40.6 |
| 2 | 1 | 42.8 | 38.1 | 48.9 | 45.3 | 39.4 | 42.2 | 32.6 | 40.5 |
| 2 | 2 | 40.3 | 42.2 | 48.2 | 42.3 | 38.8 | 39.3 | 34.4 | 38.1 |
| 3 | 1 | 40.4 | 45.0 | 48.2 | 43.0 | 36.7 | 39.6 | 48.2 | 49.4 |
| 3 | 2 | 54.0 | 45.7 | 51.7 | 49.1 | 40.0 | 41.0 | 46.1 | 51.8 |

Soil type: **Webster clay loam (Minnesota)**

| Rep. | Antecedent moisture content, percent by volume 0-4" depth | 4-8" depth | 8-12" depth | 12-16" depth | 16-20" depth | 20-24" depth | 24-28" depth | 28-32" depth | 32-36" depth | 36-40" depth |
|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | |
| 1 | 13.4 | 11.5 | 11.4 | 9.6 | 9.5 | 10.1 | 10.1 | 9.6 | 10.6 | 11.5 |
| 2 | 10.6 | 11.2 | 9.6 | 9.1 | 8.5 | 7.4 | 8.3 | 8.5 | 9.3 | 10.8 |
| 3 | 11.4 | 11.7 | 11.4 | 11.5 | 9.2 | 9.6 | 10.3 | 9.3 | 9.6 | 10.5 |
| Wet run | | | | | | | | | | |
| 1 | 23.5 | 23.3 | 22.8 | 14.3 | 10.2 | 9.6 | 10.6 | 8.7 | 8.3 | 13.1 |
| 2 | 22.1 | 21.8 | 20.4 | 19.0 | 17.5 | 8.8 | 7.8 | 8.9 | 8.5 | 11.4 |
| 3 | 23.6 | 23.6 | 21.5 | 18.8 | 10.8 | 10.4 | 10.3 | 9.8 | 10.0 | 10.0 |

*Appendix Table 6. Accessory Data From Initial and Wet Infiltration Runs on Soils With Corn After Cultivation Treatment*

Soil type: **Blount silty clay loam (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 79.0 | 71.5 | 73.5 | 20.6 | 25.6 | 32.2 | 33.6 | 39.5 | 42.0 | 37.2 |
| 1 | 2 | 66.0 | 65.0 | 71.0 | 21.4 | 27.4 | 35.3 | 32.5 | 37.4 | 41.9 | 40.2 |
| 2 | 1 | 76.0 | 74.5 | 73.0 | 24.0 | 24.5 | 38.6 | 40.8 | 34.1 | 31.1 | 22.5 |
| 2 | 2 | 71.5 | 73.0 | 71.5 | 14.6 | 22.5 | 30.0 | 33.0 | 37.6 | 34.6 | 36.2 |
| 3 | 1 | 78.0 | 75.0 | 76.0 | 14.8 | 19.8 | 28.6 | 31.1 | 31.8 | 30.9 | 34.7 |
| 3 | 2 | 73.5 | 70.5 | 72.0 | 16.8 | 22.0 | 31.3 | 30.8 | 35.2 | 30.3 | 34.2 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 71.0 | 71.0 | 72.0 | 33.6 | 35.1 | 33.5 | 33.9 | 40.8 | 42.6 | 41.6 |
| 1 | 2 | 62.5 | 65.5 | 67.5 | 35.2 | 34.1 | 39.0 | 35.8 | 38.4 | 42.5 | 45.6 |
| 2 | 1 | 77.5 | 77.0 | 72.5 | 44.2 | 38.4 | 42.3 | 48.2 | 50.2 | 44.5 | 47.0 |
| 2 | 2 | 78.5 | 78.0 | 77.5 | 34.8 | 32.0 | 35.6 | 38.0 | 35.3 | 33.8 | 33.2 |
| 3 | 1 | 62.5 | 62.5 | 65.0 | | 26.7 | 32.4 | 36.0 | 33.3 | 34.7 | 32.2 |
| 3 | 2 | 67.5 | 66.5 | 72.0 | 25.8 | 25.8 | 29.8 | 35.2 | 32.7 | 36.3 | 28.7 |

Soil type: **Canfield silt loam (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 71.0 | 73.0 | 65.5 | 21.7 | 22.7 | 25.9 | 26.7 | 28.8 | 29.4 | 32.9 |
| 1 | 2 | 65.0 | 69.0 | 67.0 | 17.2 | 15.3 | 19.8 | 19.1 | 24.4 | 24.9 | 22.1 |
| 2 | 1 | 80.0 | 70.0 | 61.5 | 14.7 | 19.3 | 30.1 | 26.7 | 27.7 | 28.9 | 36.6 |
| 2 | 2 | 62.0 | 60.0 | 62.5 | 24.0 | 27.6 | 28.6 | 31.5 | 34.7 | 43.0 | 35.2 |
| 3 | 1 | 73.5 | 70.5 | 71.0 | 16.5 | 17.3 | 24.4 | 27.2 | 29.6 | 25.6 | 23.5 |
| 3 | 2 | 67.0 | 65.5 | 67.5 | 15.4 | 18.9 | 23.9 | 27.0 | 30.2 | 28.5 | 30.9 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 67.0 | 67.0 | 66.0 | 28.7 | 25.9 | 26.6 | 25.9 | 27.4 | 27.2 | 26.3 |
| 1 | 2 | 69.0 | 68.0 | 66.5 | 27.5 | 25.4 | 27.6 | 37.0 | 34.2 | 30.8 | 28.2 |
| 2 | 1 | 76.0 | 75.0 | 66.5 | 18.5 | 25.6 | 23.1 | 24.8 | 29.6 | 23.1 | 26.6 |
| 2 | 2 | 65.0 | 63.5 | 61.0 | 31.3 | 28.9 | 29.0 | 31.9 | 38.3 | 32.7 | 30.9 |
| 3 | 1 | 76.0 | 69.0 | 64.5 | 26.3 | 27.8 | 30.6 | 31.6 | 30.4 | 25.7 | 24.8 |
| 3 | 2 | 69.5 | 68.5 | 66.5 | 27.9 | 28.3 | 30.7 | 28.1 | 29.2 | 25.5 | 25.6 |

Soil type: **Cisne silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 80 | 81 | 76 | 8.5 | 10.9 | 14.8 | 12.2 | 29.8 | 22.2 | 14.5 | 14.9 |
| 1 | 2 | 92 | 80 | 76 | 8.6 | 10.4 | 13.0 | 12.9 | 28.4 | 20.6 | 14.1 | 13.0 |
| 2 | 1 | 93 | 80 | 76 | 9.9 | 12.2 | 13.3 | 14.5 | 32.2 | 29.3 | 16.9 | 15.3 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 77 | 78 | 71 | 25.5 | 23.7 | 15.9 | 16.0 | 28.3 | 25.9 | 20.7 | 15.9 |
| 1 | 2 | 81 | 81 | 74 | 24.9 | 23.2 | 21.2 | 15.8 | 29.8 | 24.4 | 27.2 | 17.1 |
| 2 | 1 | 90 | 82 | 75 | 20.7 | 20.2 | 18.8 | 15.7 | 28.8 | 34.1 | 20.5 | 15.7 |

| Bulk density, g/cm³ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 |
|---|---|---|---|
| 2-5" depth | 1.33 | 1.25 | 1.24 |
| 12-15" depth | 1.43 | 1.41 | 1.35 |

*Appendix Table 6 (continued).*

Soil type: **Dudley clay loam (South Dakota)**

| Rep. | Dup. | Antecedent moisture content, percent by volume: 0-8" depth | 8-12" depth | 12-18" depth | 18-25" depth | 25-35" depth | 35-45" depth | 45-60" depth |
|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | |
| Representative sample | | 6.7 | 6.4 | 12.9 | 14.7 | 19.9 | 18.0 | 20.0 |
| Wet run | | | | | | | | |
| 1 | 1 | 33.8 | 33.2 | 24.4 | 20.9 | 22.8 | 28.4 | 33.2 |
| 1 | 2 | 37.8 | 33.0 | 29.3 | 18.2 | 21.7 | 26.8 | 33.4 |
| 2 | 1 | 35.8 | 35.0 | 33.0 | 27.6 | 27.1 | 31.0 | 35.8 |
| 2 | 2 | 41.9 | 40.1 | 35.4 | 32.8 | 28.2 | 31.4 | 36.6 |
| 3 | 1 | 33.9 | 26.0 | 20.7 | 24.5 | 29.4 | 26.0 | 32.9 |
| 3 | 2 | 39.8 | 34.8 | 26.0 | 22.8 | 23.5 | 27.1 | 32.9 |

Soil type: **Elliott silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis): Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 72 | 74 | 71 | 18.7 | 18.9 | 21.6 | 20.4 | 34.6 | 31.3 | 29.0 | 26.0 |
| 1 | 2 | 77 | 83 | 74 | 19.9 | 22.4 | 20.6 | 18.3 | 38.3 | 33.6 | 25.4 | 24.2 |
| 2 | 1 | 84 | | 69 | 18.0 | 22.3 | 21.6 | 20.6 | 36.6 | 33.8 | 30.6 | 22.9 |
| 2 | 2 | 62 | 66 | 64 | 19.9 | 22.1 | 22.4 | 21.4 | 32.8 | 33.1 | 30.2 | 29.2 |
| 3 | 1 | 81 | 77 | 73 | | | | | 34.7 | 30.6 | 25.7 | 26.9 |
| 3 | 2 | 85 | 77 | 72 | 21.9 | 22.5 | 24.3 | 22.4 | 31.0 | 29.2 | 25.4 | 25.4 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 65 | 66 | 72 | 28.2 | 24.8 | 23.4 | 20.5 | 32.7 | 31.4 | 26.5 | 25.8 |
| 1 | 2 | 77 | 66 | 73 | 26.7 | 27.7 | 25.1 | 24.3 | 37.3 | 31.0 | 28.1 | 24.6 |
| 2 | 1 | 74 | 79 | 66 | 28.4 | 31.4 | 24.5 | 24.6 | 33.5 | 32.9 | 26.4 | 25.1 |
| 2 | 2 | 64 | 65 | 65 | 30.7 | 20.8 | 24.1 | 25.0 | 37.5 | 32.6 | | 26.7 |
| 3 | 1 | 85 | 75 | 74 | 27.2 | 28.8 | 22.9 | 27.0 | 35.7 | 34.4 | 26.6 | 26.8 |
| 3 | 2 | 82 | 75 | 73 | | | | | 40.4 | 34.4 | 29.1 | 28.1 |

| Bulk density, g/cm$^3$ (undisturbed samples) | Replicates, duplicates: 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.13 | 1.01 | 1.09 | 1.04 | 1.07 | |
| 12-15" depth | 1.48 | 1.30 | 1.33 | 1.40 | 1.42 | |

*Appendix Table 6 (continued).*

Soil type: **Flanagan silt loam (Illinois)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Moisture content, percent by weight (dry basis) Antecedent 0-3" depth | Antecedent 3-6" depth | Antecedent 9-12" depth | Antecedent 15-18" depth | Final 0-3" depth | Final 3-6" depth | Final 9-12" depth | Final 15-18" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | | |
| 1 | 1 | 77 | 70 | 63 | 22.3 | 25.0 | 28.7 | 26.2 | 36.2 | 35.5 | 34.6 | 31.9 |
| 1 | 2 | 77 | 72 | 67 | 20.1 | 24.0 | 27.5 | 26.2 | 35.8 | 37.2 | 36.2 | 32.0 |
| 2 | 1 | 79 | 75 | 66 | | | | | | | | |
| 2 | 2 | 78 | 83 | 80 | 25.5 | 28.3 | 29.3 | 28.3 | 31.2 | 28.2 | 31.0 | 28.9 |
| 3 | 1 | 82 | 75 | 76 | 24.9 | 27.4 | 23.3 | 26.2 | 33.7 | 32.9 | 31.2 | 30.0 |
| 3 | 2 | 86 | 76 | 79 | 24.5 | 27.7 | 31.0 | 28.2 | 30.1 | 27.8 | 26.4 | 24.8 |
| Wet run | | | | | | | | | | | | |
| 1 | 1 | 72 | 70 | 67 | 32.7 | 31.5 | 31.8 | 29.2 | 32.0 | 34.0 | 31.1 | 29.1 |
| 1 | 2 | 81 | 76 | 75 | 32.1 | 32.2 | 33.0 | 30.0 | 37.0 | 37.4 | 36.5 | 32.7 |
| 2 | 1 | 78 | 78 | 70 | 32.1 | 33.1 | 33.1 | 30.4 | 38.3 | 35.0 | 34.1 | 30.7 |
| 2 | 2 | 82 | 68 | 80 | 22.2 | 25.6 | 27.2 | 26.1 | 34.8 | 34.4 | 32.3 | 30.6 |
| 3 | 1 | 78 | 76 | 68 | 27.3 | 28.2 | 28.4 | 28.2 | 32.9 | 35.7 | 30.4 | 28.8 |
| 3 | 2 | 75 | 76 | 75 | 29.2 | 30.4 | 32.9 | 30.1 | 37.2 | 34.8 | 34.1 | 29.1 |

| Bulk density, g/cm³ (undisturbed samples) | Replicates, duplicates 1,1 | 1,2 | 2,1 | 2,2 | 3,1 | 3,2 |
|---|---|---|---|---|---|---|
| 2-5" depth | 1.14 | 1.05 | 1.23 | 1.16 | 1.14 | 1.19 |
| 12-15" depth | 1.22 | 1.27 | 1.24 | 1.25 | 1.26 | 1.21 |

Soil type: **Hoytville clay (Ohio)**

| Rep. | Dup. | Soil temp., °F. Before | Soil temp., °F. After | Water temp., °F. | Antecedent moisture content, percent by volume 0-3" depth | 3-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | | | | |
| 1 | 1 | 78.5 | 77.0 | 78.0 | 27.1 | 28.3 | 30.9 | 28.9 | 31.2 | 30.4 | 30.7 |
| 1 | 2 | 64.5 | 67.0 | 73.0 | 26.4 | 26.8 | 31.8 | 29.3 | 30.7 | 30.9 | 31.5 |
| 2 | 1 | 81.5 | 72.5 | 79.5 | 20.3 | 22.6 | 27.6 | 27.6 | 30.2 | 29.5 | 30.2 |
| 2 | 2 | 89.0 | 88.0 | 80.5 | 26.1 | 28.6 | 32.1 | 31.0 | 30.6 | 28.0 | 30.0 |
| 3 | 1 | 74.0 | 69.0 | 66.0 | 21.4 | 25.4 | 32.7 | 32.0 | 31.9 | 31.3 | 33.5 |
| 3 | 2 | 68.0 | 66.5 | 67.0 | 22.4 | 24.7 | 27.7 | 27.5 | 28.6 | 28.7 | 27.7 |
| Wet run | | | | | | | | | | | |
| 1 | 1 | 75.0 | 72.0 | 70.5 | 40.5 | 35.1 | 34.6 | 34.4 | 33.6 | 32.6 | 31.5 |
| 1 | 2 | 66.5 | 67.5 | 66.5 | 40.0 | 38.4 | 36.4 | 33.8 | 34.1 | 32.8 | 33.5 |
| 2 | 1 | 71.5 | 68.0 | 68.5 | 42.4 | 34.7 | 34.2 | 31.6 | 33.9 | 31.3 | 33.0 |
| 2 | 2 | 70.5 | 67.5 | 68.5 | 40.8 | 37.3 | 33.7 | 33.9 | 33.2 | 34.9 | 35.8 |
| 3 | 1 | 66.0 | 68.5 | 66.0 | 39.6 | 34.9 | 34.2 | 36.5 | 34.6 | 34.1 | 34.5 |
| 3 | 2 | 76.0 | 69.0 | 67.0 | 39.1 | 36.4 | 37.6 | 34.7 | 35.4 | 34.2 | 34.1 |

Soil type: **Kenyon silt loam (Minnesota)**

| Rep. | Antecedent moisture content, percent by volume 0-7" depth | 7-13" depth | 13-24" depth | 24-30" depth | 30-40" depth | 40-48" depth |
|---|---|---|---|---|---|---|
| Initial run | | | | | | |
| 1 | 11.5 | 10.6 | 12.0 | 8.6 | 7.1 | 8.7 |
| 2 | 24.0 | 19.0 | 20.6 | 15.0 | 14.8 | 14.3 |
| Wet run | | | | | | |
| 1 | 21.4 | 19.9 | 14.7 | 8.5 | 10.2 | 12.1 |
| 2 | 32.5 | 21.3 | 26.5 | 23.2 | 16.0 | 15.3 |

*Appendix Table 6 (continued).*

Soil type: **Kranzburg silty clay loam (South Dakota)** Crop stage: Cultivated, two feet tall

| Rep. | Dup. | Antecedent moisture content, percent by volume 0-8" depth | 8-14" depth | 14-20" depth | 20-28" depth | 28-35" depth | 35-45" depth | 45-60" depth |
|---|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | | |
| Representative sample | | 25.3 | 23.7 | 23.3 | 40.8 | 13.7 | 25.2 | 25.8 |
| Wet run | | | | | | | | |
| 1 | 1 | 32.2 | 35.4 | 35.7 | 29.5 | 23.2 | 27.6 | 29.8 |
| 1 | 2 | 36.1 | 35.5 | 35.4 | 30.7 | 25.3 | 26.4 | 27.4 |
| 2 | 1 | 32.7 | 31.3 | 27.5 | 25.7 | 23.0 | 25.4 | 24.3 |
| 2 | 2 | 34.7 | 34.8 | 36.4 | 29.9 | 25.9 | 24.9 | 30.6 |
| 3 | 1 | 35.3 | 38.3 | 34.8 | 27.6 | 27.1 | 29.9 | 28.6 |
| 3 | 2 | 31.1 | 31.4 | 28.2 | 21.2 | 18.6 | 24.4 | 18.5 |

Soil type: **Morton loam (North Dakota)** Crop stage: Cultivated, tasseling

| Rep. | Dup. | Soil temperature (°F.) at 4-in. depth, Initial run, Before | Initial run, After | Wet run, Before | Wet run, After | Aggregate stability of surface 3 inches, Mean weight diameter, mm |
|---|---|---|---|---|---|---|
| June | | | | | | |
| 1 | 1 | 65 | 63 | | 66 | .23 |
| 1 | 2 | | 65 | | | .76 |
| 2 | 1 | 60 | 62 | | | .33 |
| 2 | 2 | | | | 68 | .42 |
| 3 | 1 | 77 | 72 | 70 | 67 | .24 |
| 3 | 2 | 60 | 62 | 58 | 59 | .28 |
| | | | | | Average: | .38±.08 |
| August | | | | | | |
| 1 | 1 | 87 | 75 | | | .39 |
| 1 | 2 | | | | | .62 |
| 2 | 1 | 65 | 68 | | 69 | .51 |
| 2 | 2 | 80 | 70 | | | .45 |
| 3 | 1 | 84 | 65 | | | .38 |
| 3 | 2 | 83 | 74 | | 72 | .32 |
| | | | | | Average: | .45±.04 |

| | Initial run antecedent moisture content, percent by volume 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth |
|---|---|---|---|---|---|---|
| June | 30.7 | 30.2 | 28.9 | 28.8 | 33.0 | 27.5 |
| August | 17.8 | 20.0 | 23.6 | 24.5 | 23.6 | 26.9 |

Soil type: **Port Byron silt loam (Minnesota)** Crop stage: Cultivated, tasseling

| Rep. | Antecedent moisture content, percent by volume 0-8" depth | 8-15" depth | 15-20" depth | 20-30" depth | 30-37" depth | 37-48" depth | 48-54" depth |
|---|---|---|---|---|---|---|---|
| Initial run | | | | | | | |
| 1 | 18.1 | 16.0 | 15.0 | 16.1 | 14.5 | 14.0 | 12.4 |
| 2 | 24.7 | 21.6 | 20.5 | 21.2 | 21.1 | 13.3 | 20.5 |
| 3[a] | 18.5 | 16.7 | 12.2 | 13.5 | 12.8 | 14.2 | 17.5 |
| Wet run | | | | | | | |
| 1 | 30.5 | 28.5 | 18.5 | 18.4 | 15.2 | 13.2 | 14.1 |
| 2 | 35.3 | 35.4 | 32.6 | 27.0 | 19.8 | 21.2 | 22.4 |
| 3[a] | 34.3 | 25.2 | 22.1 | 16.7 | 15.5 | 16.6 | 18.7 |

[a]Values for this replicate are questionable.

*Appendix Table 6 (continued).*

Soil type: **Sinai silty clay loam (South Dakota)** Crop stage: Cultivated, five feet tall

| Rep. | Dup. | Antecedent moisture content, percent by volume | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 0-6" depth | 6-12" depth | 12-18" depth | 18-24" depth | 24-30" depth | 30-36" depth | 36-42" depth | 42-48" depth |
| Initial run | | | | | | | | | |
| Representative sample | | 34.8 | 34.1 | 36.1 | 37.4 | 27.6 | 29.3 | 32.3 | 36.1 |
| Representative sample | | 42.1 | 33.3 | 46.6 | 38.6 | 30.5 | 36.7 | 37.2 | 40.3 |
| Wet run | | | | | | | | | |
| 1 | 1 | 45.7 | 40.8 | 37.2 | 47.1 | 32.5 | 32.2 | 31.8 | 39.7 |
| 1 | 2 | 45.5 | 31.8 | 39.3 | 44.5 | 31.7 | 36.0 | 40.6 | 42.3 |
| 2 | 1 | 41.5 | 36.9 | 47.0 | 37.5 | 33.5 | 32.5 | 35.6 | 38.4 |
| 2 | 2 | 37.3 | 37.3 | 43.1 | 39.1 | 41.1 | 36.1 | 38.2 | 34.9 |
| 3 | 1 | 41.9 | 36.2 | 38.0 | 40.9 | 32.9 | 32.2 | 39.6 | 36.5 |
| 3 | 2 | 44.9 | 39.9 | 47.4 | 47.9 | 35.8 | 38.4 | 35.6 | 39.6 |

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